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It is not intended that the magazine should be run at a profit so that as our subscribers increase the magazine will be issued in a more attractive form. More illustrations, will then be possible.

It is the aim of the management to run the magazine for the Ranger-class (including Foresters) and mainly by their contributions. Correspondents are needed to supply suitable matter to maintain the magazine on these lines. We feel confident that this appeal will not go in vain. There must be a number of our readers who have something of interest to write on.

Subscribers are requested to inform the editor of all changes of address, and communicate with the principal by name in the event of copies not being regularly received.

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South India.

A TIMBER 'SLIDE' AT DHONI.

(Reprinted from the 'Madras Mail,')

The Dhoni Timber Depôt in Palghat district is an active centre of Forest exploitation, The most medern methods of extraction are employed in the forests above, which feed the timber slide shown. Down this the logs travel at such a rate that it has been found necessary to divert a stream into the slide to prevent the cross pieces from taking fire.

C.C. Wilson.

The Madras Forest College Magazine.

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THE

Madras Forest College Magazine.

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The Ceylon Sleeper Supply.

IN Ceylon, unlike other countries, the Railway forms a separate and independent department. Some years ago, the Railway Department had to get sleepers from Australia at a great cost, resulting in the drain of a large sum of money from the country as a large quantity of sleepers was consumed every year. Later, the Ceylon Forest Department undertook the supply of sleepers and the money was retained within the country.

As a result of Government taking up the supply, not only is the cost of sleepers much reduced, but also they are being supplied within a short period in any part of the year

at any required station. The Forest Department began the supply on a small scale and at present is able to meet the whole demand though sleeper operations are carried on in almost all the nine forest divisions of the Island.

There are only two kinds of railway lines in the Island the broad and narrow gauges, for which only broad and narrow gauge sleepers are required whose dimensions are 9` × 10″ × 5″ and 5′ × 10″ × 5″ or 5` × 9″ × 4½″ respectively.

A sleeper should possess the qualities of durability, hardness, strength, seasoning power and elasticity and therefore only from those woods which have these qualities the sleepers are to be converted.

The sleeper conversion is given on contract and carried on under strict supervision of the Forest Department..

The begin with, the sleepers were converted from *Mesua ferrea* and *Chloroxylon swietenia* (satinwood)—a first class timber used largely for furniture, ornamental work etc owing to its beautiful silver grain. When this timber is distinctly "flowered" — i. e. silver grained—it is known as one of the most beautiful timbers in the world. Satinwood sleepers are said to last even thirty years. As this species is more costly than other woods and would become rare if extensively felled, *Vitex altissima* and *Mimusops hexandra* ; are now being used in its place. At present almost the whole supply of sleepers is from these two species throughout the Island as they have proved satisfactory and are found abundantly

Owing to the present increasing demand of sleepers by the Railway Department, the Forest Department experimented in the conversion of sleepers from *Alseodaphne semicarpifolia* a large tree common in the hot drier parts of the Island—to increase the supply. Sleepers from this species were tried and found satisfactory and a year or so ago the first supply from them was given to the Railway Department. The sawing of this kind of timber is found to be easier than the other mentioned species and as a result the sawing charges are less.

The contracts are given by calling for tenders and the lowest bid for the conversion and delivery of a broad gauge and a narrow gauge sleeper in the tender is accepted, and an agreement is then made for the supply of the required number of sleepers in a given period within a specified portion of a forest. When an area of forest is under work another area is being inspected for the coming year as there are no selected forests to work in a rotation. After a forest is inspected and found suitable for conversion of sleepers, the boundaries of the area are fired and all the required species of trees of 4' 6" and over in grith are enumerated for felling and converting into sleepers. Only trees enumerated are to be felled and as low as possible not exceeding six inches above the ground.

The successful contractor is to establish his saw mills in a suitable locality in the forest, and transport all the felled timber there. The sleepers may be converted either by sawmills or scaffolding or pit system. The contractor is not allowed to dig

pits or put up scaffolds any where he likes in a forest, and the sawing operation should be confined only to one spot.

While felling trees the saw has to be used and not the axe at all as otherwise there is wastage of timber and the stumps are rendered unfit for producing shoots.

The sleepers are sawn in a rectangular form with flat even surface without depressions having parallel sides well defined edges, free from shakes. Trees that are attacked with fungus or are hollow are rejected and only from sound trees sleepers are sawn When a log is sawn into sleepers the outside slabs —known as "poravat" left as waste, are sawn into scantlings of not less than ten feet in length having cross sections of $4\frac{1}{2}'' \times 2''$, $4\frac{1}{2}'' \times 3''$, $5'' \times 4''$, $6'' \times 5''$, $6'' \times 4''$, $7'' \times 2\frac{1}{2}''$, $7'' \times 3''$, $8'' \times 3''$, $9'' \times 2\frac{1}{2}''$, $9'' \times 3''$, $9'' \times 4''$, $10'' \times 3''$, $11'' \times 2\frac{1}{2}''$, and $11'' \times 3''$. Scantlings sawn to the above dimensions are sold to the Public Works Department If there be defective or hollow trees among the trees enumerated, they should be felled and converted into scantlings of above sizes. In order fully to utilize and economise in timber the trees are logged into ten or eleven foot lengths from which good broad gauge and narrow gauge sleepers can be obtained by allowing a margin for cracking and splitting. So it enables the conversion of scantings of required length, breadth and thickness from outside slabs. The contractor is paid for sawing scantlings according to the number of cubic feet they contain

The converted sleepers are immersed in water whenever possible for water seasoning or stacked under shade for air seasoning in such a way that these is free circulation of air all round them. The method of stacking sleepers is by laying them at the bottom edgewise a little apart from one another and then over them a layer breadthwise at a similar distance and again over them another layer similar to the first layer and so on. Sleepers stocked in this manner are not subjected to cracks and warps as the wind that blows in one direction passes off freely from the other side drying the sleepers uniformally and as there is weight equally distributed over sleepers. The assistant conservator of Forests—District Forest Officer—in charge of the division inspects the sleepers when the contractor is to be paid and selects only those that are converted according to the prescribed manner and the rest are rejected The contractor is given the privilege of turning a bad broad gauge sleeper into a good narrow gauge one at the saw pit before the assistant conservator of Forests of the division comes to take over. Though the rejected sleepers are not poid for, they are taken over by the government. The sleepers are delivered to the Railway Department after the inspection by a Railway Officer Meanwhile, the scantlings converted from the outside slabs are given over to the Public Works Department. The remaining outside slabs out of which no scantlings are converted, are sold by public auction or sent to Public Departments when required.

The sleeper operations are confined only to Other Crown Forests though there are three more kinds of forests in the Island. viz:— Reserved Forests, Proposed Reserve Forests and village Forests.

H. WIJESINGHE.

M F C. 1920—22 Dn.

Formation of a fuel working circle in Chandragiri range.

The formation of a fuel working circle was for some time a great want for Chandragiri Range The working plan prepared for the range became a failure in that the coupes of most of the felling series were not sold in auction for want of demand. If a coupe was taken at all only the plain portions were exploited and the hilly tracts left untouched which continued so during the subsequent years. Situation of the coupes at remote places and on tops of hills or valleys enclosed all round by hills, want of means of transport of the produce and the unwieldy size of the coupes were the nearest causes for the failure of the working plan. Demand for fuel is felt keenest only during certain parts of the year, i. e. from July to Febrary all around villages for cultivation of sugar cane and preparation of jaggery. The villagers satisfy themselves with their own needs and care little for the convenience of other villagers The cost of labour is great and felling the whole coupe and leaving the produce unsold causes contractors much inconvenience and damage.

The range consists of a long parallel series of hills over three - fourths of its extent and the remaining southern corner is also all hilly with villages enclosed in them. In the open valleys groups of villages could be seen with strong sturdy inhabitants

tending their cattle and ploughing their fields. Along the valley between the long series of hills. a railway train may be seen enveloped in smoke stuggling along in its ascent or sometime hence another train gliding along the railway line with great speed in the opposite direction. Now and then motors can be seen racing with the train along the local fund road which runs by the side of the railway line.

The fuel extracted from the coupes should inevitably take one of these routes. The villagers care for their own need and the contractors of coupes care for these villagers only.

Though the forest could not boast of any valuable timber species, it has in its own way good timber trees which are unfortunately not within easy reach or removal. *Tectona grandis* has grown on the plataeus intermingled with *Chloroxylon Swietenia*, *Anogeissus Latifolia*, *Hardwickia binata*, *Terminalia chebula* and *Diospyros Ebenum* On the slopes of the hills and on the plains *Chloroxylon Swietenia*, *Diospyros Ebenum*, *Albizzia amara* and *Acacia Sundra* are prominent among other species.

Many defects were noticed by lapse of time in carrying out the provisions of the working plan. Large areas of sheetrock, rocky soils devoid of any vegetation and localities containing very poor growth not fit even for fuel were included for exploitation. It so happens that the major portion of a coupe has any one of these defects. The coupes to be worked are usually located far away from the villages and sometimes cover the tops of hills. Further

there are no roads or carttracks up those hills for the removal of produce It may be suggested that cart - tracks constructed along these places would considerably facilitate the removal of produce, but the meagre income derived from the sale of these coupes at the heights does not compensate for the great cost of constructing cart tracks, which during winter, are liable to be washed off by mountain torrents or defaced by boulders rolling from above. Moreover each of the coupes was from 120 to 160 acres in extent and as experience has shown, this was too unwieldy to be worked within a year.

The preparation of the present working plan is an improvement in various respects on the original It forms one fuel working circle for the whole range and consists of 11 fuel felling series arranged around the villages all over the range. Each felling series surrounds a number of villages and the coupe auctioned supplies fuel for its nearer villages Proximity to the villages, easy accessibility and removal of the produce, exclusion of blanks, and compactness of each coupe are the essential characteristics on which the present plan is based. No coupe is far away from the villages for which it is intended, no cart-track need be constructed for the removal of the produce, no blanks have been included and lastly the area of each coupe is small and easily workable within a year

For forming a felling series the whole of the forest is first inspected with a view to note the composition and consistency of the forest and the suitability for forming a felling series. Starting from the reserve boundary a straight line is cut up the slopes of the

hills from where good growth starts to a point of reasonable and easily accessible height whence a contour line i. e. a level line at that height is cut with the aid of the ghaut tracer all along the slope of the hills until a satisfactory area of not less than 1500 acres is obtained when this is joined to the reserve boundary by another straight line

The lines are then surveyed and plotted. Since a felling rotation of 30 years is fixed for fuel coupes, the area is dvided into 30 coupes of 50 acres each. When compensation area is allowed for some coupes on account of lesser growrh in them than others, the area varies from 50 to 60 acres for each coupe. The coupes are then divided on the plan and each coupe is marked on the ground a year previous to its being put to auction.

Thus the present working plan has improved on the original. It has proved a success and the first significance of success has been shown in the high sale of the first coupes of each felling series.

S Sankaran,

1921—23 Course.

M. F. C.

Teak.

"TEAK THE ORGANIC STEEL."

By—S. C. Ramalingam M. F. C. (1920—22 *Division*)

Second Essay for the Indian Forester Prize for present students.

Distribution :—

This tree botanically known as Tectona grandis is indigenous in the peninsulas of India, Indo—China, and in the islands of the Indian Archipelago. However, it is not uniformly distributed all over, on account of the varying elevations and other climatic conditions It grows in Burma, Java, and Siam and is also found in Central and Southern India. But Burma is said to produce the best teak.

Requirements and Habitat : -

(a) Elevation. It thrives from sea level up to an altitude of 2,500 ft,, beyond which it seldom or never does well, though a few stunted ones may be seen at an elevation of about 3,000 ft. The best growth is obtained between 300 and 800 feet above mean sea level.

(b) Climate and Rainfall. For a moderate growth it requires about 60 inches of rain in the year, and with a heavier fall, grows better. It thrives best at a temperature ranging

from 60 to 80 degrees Fah , with a mean annual temperature of about 75 degrees.

(c) Soil. Though it is not generally a gregarious species, yet its liking for alluvial soil is so much that it tends or form patches of almost pure crop on alluvial soils

The two essentials necessary for its successful growth are:—

(i) Good drainage

and (ii) A dry and deep sub-soil

Though it accomodates itself both in sandy and clayey soils, thrives best on sandstones and entirely avoids laterite soils. The want of a well drained and deep sub-soil may be clearly exemplified by comparing and contrasting the Teak trees in the Plantations at Nilambnr, which are a Paradise and Treasure to a Forest Officer, with the stunted, stag-headed, dilapidated, and deteriorated Teak trees of the Mudumalai Natural Forests. The former yields a clean sound bole of 70 to 80 feet in length and 6 to 8 feet in girth while the latter is not capable of producing a single straight bole of 15 feet length and 4 feet girth; the former protects and betters the soil with its complete canopy, while the latter impoverishes the soil more than protecting it for want of enough foliage during a major part of the year.

Here I may mention, that the Teak Plantations at Nilambur are divided into three classes, according to the height

growths they attain, which are in their turn proportional to the nature of the soils on which they grow. The crops growing on pure alluvial soils are classified under the first class, those on a mixture of alluvium and gravel under the second class, and those on laterite soils under the third class.

Teak is a strong light demander and as such does not at all do well under the shade of other trees. In good soils, Bamboo and Pterocarpus Marsupium are two of its chief associates and in laterite soils, Xylia takes their place.

Reproduction :—

Teak flowers early in August and the fruit ripens in the latter part of December, and falls off by February or so. Its fruit is almost round, with a hard nut of about half an inch in diameter. It starts fruiting when it is very young, and seeds abundantly every year. The hard shell of the nut is of a great advantage, for its suceessful resistance against fire. The germination of these seeds is very slow even in moist climates. Hence, in dry regions, it is hastened by soaking the nut in water before sowing, Sowing is generally done by putting three to five seeds in a hole, an inch, or an inch and a half deep and lightly covering same with loose earth. The germination takes about two to three weeks. Natural Regeneration also is effected by the germination of the fallen seeds under the parent tree.

Teak also reproduces profusely by coppice shoots with enough overhead light. The young coppices are very sensitive to rain drops falling on them from other plants. Hence, enough care should often be taken while cutting for coppice to see that no drooping branch of any other tree overhangs the stump. This is my experience gained during the Improvement Fellings, we did at Kargudi, during February last.

Shape and size :—

The young seedling has a very long tap - root, which is very soft and sensitive. The terminal shoot of the young seedling is very strong, and this enables it to pierce through overhead cover to secure light. It grows very fast when young, and usually has a clean straight bole with a large crown. The seedlings take about ten years to establish themselves. On good soil and favourable climatic conditions. Teak has an exceedingly rapid growth in the young stage. The usual exploitable size is 7 feet in girth The height of a large Teak tree is said to be about 140 feet, and for a tree of this height a clean bole of 70 feet length is not extraordinary. However, when grown in irregular crops, the stems are often fluted, buttressed or otherwise illshaped. The annual rings on a cross section are very distinct and regular.

Treatment of Teak Forests :—

This species, being used more as timber than fuel, is often worked under the High Forest System, the method applied

invariably in almost all parts, being the Clear felling method. When grown in close crop, this being an extreme light demander employs all its energy in pushing its head up in search of light. If not grown close it would naturally obtain the required light from the sides by shooting out lateral branches lower down. This is clearly seen from the Epicormic branches appearing all of a sudden, when a crop had been opened by a heavy thinning. These branches come out from dormant buds on the sides, which are stimulated by the sun falling on them when the crop is opened. The shooting of the lateral branches not only hinders the height growth but also results in the appearance of several twists and knots on the bole. Therefore, Teak planting is often done 6′ × 6′, thus having a crop of nearly 1,200 seedlings to the acre. For the first two years these seedlings require weeding and enough care should be takan to see that they are not overtopped or covered by any other plant or shrub, lest they should wither away for want of enough light. They are allowed to grow thus for about 5 years, when the thinning operations are started with an ultimate object of having a final crop of 36 trees to the acre when the crop is nearly 35 years old. The thinnings are done slowly and at regular intervals of 6 to 10 years, the interval being the time that the standing trees would take to fill up the opening in the canopy caused by the thinning. The thinning may be done mechanically by removing alternate trees or by selection according to the nature of the crop, when the work is taken up. In second class soils, thinnings are often

done with a view to have a final crop of 45 trees to the acre Care should also be taken to see that the thinning is not improportionately done and the canopy heavily opened, lest it should result in the appearance of Epicormic branches as seen at Nilambur, on account of the dormant buds present on the sides getting stimulated by the action of the rays of the sun. These Epicormic branches are also attributed to the defoliation caused by caterpillars: but this however is not definitely ascertained. The best treatment prescribed for this so far is under-planting of some other species, such as Xylia Xylocarpa, which, on first class soils, grows much slower than Teak. The above points, facts and figures regarding planting, treatment, and Epicormic branches are from my short experience at Nilambur.

EXTERNAL INJURIES :—

The external dangers, that are liable to attack Teak, are wind, frost, fire, wild animals, defoliators and Loranthus. Wind, as a rule in close crops, does little harm and this is further minimised by the maintenance of a wind-belt of some strong and windfirm species.

As for frost, little or no danger is had in Central and South India, which are the chief homes of Teak.

Though Teak resists fire considerably on account of its thick and fibrous bark, yet fire is the worst of the above

enemies: but little has to be feared, if a sufficient staff under proper management is provided for fire protection.

Of all the wild animals, Elephants and Sambar are the worst for Teak. They strip off the bark and break the leading shoot thereby making the tree entirely useless. This difficulty may be overcome by providing for a trench 6 feet wide and 6 feet deep along the boundaries of the Plantations.

The effect of defoliators was clearly seen at Nilambur: Up till now no proper remedy had been found out for this and as such, it is difficult to keep them entirely out of the way

Loranthus too is one of the chief enemies But, under proper care, this is overcome by cutting away the branches attacked with this pest and smearing the cut end of the stump with tar.

TIMBER AMD UTILITY:—

The Green timber is said to be over 60 lbs in weight per cubic foot and will not float in water. Seasoned wood weighs 45 lbs per cubic foot The wood, when dry, is light. Its timber works easily and takes in a good polish. It is moderately hard, strongly scented, and contains an oil, which is easily perceptible to the touch and preservative Its sapwood is white and usually small and the heart-wood is dark, golden yellow turning dark brown and finally almost black with age. It seasons readily and

shrinks little and for strength and durability, it is superior to every other wood whether in or out of water. It does not crack, warp, shrink, or change its shape when properly seasoned.

Being of an oily nature, it preserves iron works and is theretore of great value to ship-builders. It is rarely attacked by white ants or fungus. This is the chief timber employed in buildings for beams, trusses and rafters, door and window frames and all kinds of interior furnishing such as flooring, staircases, etc. It is also vastly used for ship-building, coach-building Railway sleepers and various other purposes. It is also used for carts and *agricultural* implements. The wood is said to last extra-ordinarily long when continually immersed in water.

The wood oil is very important. It is used as a varnish for rubbing over other wood works and is also used for cleaning and preserving guns and rifles from corroding.

The facility of being easily worked, together with its exceeding strength and durability and the medium state regarding hardness and weight have earned this timber such a good fame and demand in the market, that it has become the object of all Forest Owners and Managers, State or Private, to cultivate Teak. Among artificially raised Forest Crops, Teak stands foremost, forms the major portion and receives the greatest care and attention.

Forest Life in India (*Continued*)

III. Elephants.

(*Reprinted from 'the Varsity' May 20, 1913.*)

As special work in his district the District Forest Officer may have to look after a small herd of elephants, which are used for dragging and stacking timber. This is most interesting work, and when you come to know him the elephant needs as much looking after as, and is certainly more delicate than, the horse.

As every one knows, the elephant is unusually teachable, though the extra-ordinary tales of his intelligence one hears should be taken with a grain of salt. He can, with patience, be taught to do a great deal, but I have never known one with the power to think out a course of conduct such as is ascribed to him in the yarns one hears repeated and believed.

The Government elephants in a "Circle" of districts usually have a Government veterinary surgeon in charge of them who tours round and inspects and reports on them, prescribing special diet or treatment for those that are sick or out of condition. This by no means relieves the District Forest Officer of

his responsibilities in regard to the elephants under him, but is merely an additional safeguard.

Elephants should not be put into full working until they are at least twenty years old; before this they may be given light work or short hours. For instance our, "nursery elephants' were put on to weeding out, from the plantations, the 'Lantana' —a prolific and destructive weed, rather like a very exaggerated raspberry cane, but without its succulent fruit—or on to dragging small poles for a few hours a day. The full working elephant does about six hours' work a day three in the morning and three in the evening. The usual method is to harness him to the log he has to drag, and provide him with a partner who pushes behind. The pushing is done with the tusks and base of the trunk. When the log is brought to its destination it may have to be piled on others, and if it is small enough it is then lifted up bodily by the elephant and placed on the pile. Great nicety is shown by the animals in fitting such logs into place, and it is here, in my opinion, that they show their greatest intelligence, as they will, without direction, arrange the logs in a stack firmly so that they will not roll down. An elephant lifts a log of this sort by kneeling down on his fore knees (for, an elephant also has knees on his hind legs,) pushing his tusks under it and then while holding it in place with his trunk, raising himself from the ground. It is therefore his tusks that bear the whole weight of the log, and there is considerable danger of his

breaking them if urged to lift too heavy a weight. Needless to say, it is only "tuskers" that can do this work and they are therefore the most highly prized. Elephants may in this connection be divided into three classes: (1) cows, who have no tusks, (3) "Muknas," bull elephants with embryo tusks; and (3) 'Tuskers' which are also bulls. The reason for the "Mukna" having no tusks has not yet been satisfactorily explained.

During the heat of the day the elephants do not work, are turned loose, and they wander off and graze on bamboo leaves and reeds. They eat a vast quantity of greenstuff and in the wild state they spend about 20 hours out of the 24 in grazing They usually sleep standing, and it is very unusual to see a healthy elephant lie down voluntarily.

In the evening after their work is over they are brought back to camp and washed. For this purpose they are taken to a shallow pool and made to lie down in it and their mahouts scrub them with cocoanut shells. This is a performance of which they are very fond, and it is a most amusing sight to see them lying like half-submerged rocks, with the tips of their tongues stuck out ot the water for the purpose of breathing, and their little brown attendants scraping away at their rough hides.

They are then formed up in line and fed with half of their daily rations, the other half being given before they go out to work in the morning. Their rations consist of cakes made of boiled rice, grain, etc, and pieces of cocoanut. Each elephant has two attendants, a "Māhout" and a "Cāvadi." The mahout is the chief and the cavadi is under his orders, and it is the latter who feeds the animal. He bears a great lump of food on his hand up to his elephant, and pushes it into his mouth with a motion rather like that of "putting the weight" The elephant stands ready for the purpose with his head up and his mouth open, and then when he has received the dainty mouthful, he munches away with much delibration and evident enjoyment, while his cavadi stands by with another lump until his mouth is sufficiently empty All this while the mahout remains by his elephant's heap of cakes to see that none are surreptitiously removed by one of his confreres, to be devoted to the nourishment of the latter's particular charge.

After their evening meal is over the elephants are turned loose to graze through the night, each with a long chain attached to one of his hind feet so that if he strays far afield he will leave a track that is easy to follow when he has to be caught and bronght in for work on the morrow.

In addition to their timber work the elephants are used for carrying baggage and also as a means of transport for the District Forest Officer, when necessay. Much the most comfortable way of riding an elephant is to sit on his neck and drive him yourself; this it is not at all difficult to learn to do when he gets used to you; you guide him by words of command and by pressing with your toes behind his ears; if you are riding him for purposes of shikar you employ the latter method only, so as to avoid making a noise. However, stalking deer or bison on an elephant is hardly legitimate sport, as they will allow him to come up quite close without any fear, thinking him to be a known and trusty friend, though there is, of course, no objection to adopting this course for purposes of photography, or when beating for or following up dangerous game such as tigers or panthers.

Elephants are all strictly preserved by the Government and none may be shot. There is an exception to this rule, namely when one becomes dangerous. This happens usually when an old bull has been turned out of the herd and goes musth or when an elephant has been badly wounded and then not hilled. Such rogue elephants are very dangerous, and entirely lose their fear of man, and when one is without doubt in this state the District Forest Officer reports the fact to Government

and recommends that it should be "prescribed" and a price set on its head. Then anyone *may* shoot it, but there are not as a rule very many candidates for the honour. It is usually left to the District Forest Officer himself, or some sporting planter, as it is a very dangerous game and generally means a week or fortnight of constant shikaring and tracking. However, to the lucky man who brings such a brute to book the Government generally presents the tusks as well as the reward they have offered.

The reason for this strict preservation of elephants is that they are wanted for timber work, and for this purpose they are caught and trained, the capturing, of course, being done by the Forest Department; and of all the varied work that falls to the lot of Forest Officers in India this is, in my opinion the most interesting.

CHOKRA.

Notes on an experiment carried out to test the effect of poisoning sandal seeds on germination etc.

An experiment to find out the effect of poisoning sandal seeds with Redoxide of mercury and Perchloride of mercury was started in April last in the compound of the rest house at Panapakam with a view to ascertaining whether rats attacked peisoned seed and whether poisoning affected germination. The results were as follows:—

On 8—4—21, 600 good seeds were selected, 200 of which were soaked for 3 hours in a solution of Red-oxide of mercury formed by mixing 10 grains with 2 oz. of water. The seeds were then taken out and spread on the ground with the exception of 20 which were sown in a pot 200 other seeds were soaked in a concentrated solution of Perchloride of mercury for 3 hours and taken out and spread on the ground, 20 being sown in another pot. The remaining 200 seeds were not in any way specially treated and of these latter 200 were spread on the ground and 20 were sown in a third pot. The pots were regularly watered

Till 3—5—21, nothing happened but I could not come to any conclusion therefrom because the fact that even unpoisoned seeds were not touched by rats or squirrels appeared to show that there was an absence of these animals just about there (compound of Panapakam rest house) All the three sets of seeds were then shifted to the Ranger's house at Chendragiri where rats were said to be plentiful. On examination of the seeds again on 27—5—21 it was found that all the seeds had been eaten by rats but no germination was observed even till 4—6—21 in any of the pots in which seeds had been sown.

A further experiment was tried in the Ranger's house using a more concentrated solution of each poison Perchloride of mercury being 1 in 30 and Red oxide 10 grains to 1 oz. of water. 120 seeds were soaked in each for 36 hours and then taken out and kept in zinc buckets. As a result of even this experiment it was found that all the seeds had been eaten up. The seeds sown in pots did not however germinate even till 26—7—21,

I think the experiment is interesting as showing that it is not easy to keep rats away from sandal seed. Of course I have no record to show if any of the depredating rodents died as a

result of their feat, possibly some at least did, but that does not affect the main points that the seeds were destroyed and that those sown did not germinate.

A. M C. LITTLEWOOD;

5—10—21

District Forest Officer,

Chittoor.

[The experiment is interesting, and instructive. Seeds were treated in a variety of similar ways in South Vellore district this year and dibbled in the forest. Hardly any germinated, and it is assumed that rats and squirrels ate them. From the fact that we find natural seedlings more in thick thorny hedges than in other places it seems probable that the predatory rodents find it less easy to find the seeds in such places. It is, therefore, being arranged that all patches of dibbled sandal seed on the Madras Forest College estate are to be covered with a thick mass of thorny material in the hope that this may save the seeds—*Editor.*]

Madras Forest College Sports.

(Wednesday the 7th September 1921: successful meet)

The annual athletic sports of the College were held on the 7th September on our athletic grounds commencing at 3 p.m. sharp, and proved a very successful meeting.

The weather could not have been better. It was a cool afternoon, rather on the dull side. This allowed the bulk of the spectators to sit or stand in the open while the two tents were filled with ladies (1 with European Ladies and the other with Indian Ladies) who were interested spectators of the sports.

The ground was well laid out by the senior Division students and the arrangements altogether reflected much credit on our Vice-President (Mr. G. C. Robinson).

Mrs Wilson kindly undertook the arrangement of the European tent, and the entertainment of visitors, and carried out in a most successful manner the task which must have entailed a vast amouut of labour.

The following were the several officials who contributed to the smooth working of the programme: Messrs H.F.A. Wood; C.E.C.

Fischer; F.R. Parnell; M.R. Ramaswamy Sivan; C.S. Ratnasabapathy Mudaliar; E Stanes; C. C. Wilson (Principal) E. K. Krishnan; W.G. Dyson; W.C. Hart; and Revd. F.R Jambeau.

The sports were on the whole interesting and the existing record 5′—30″ for the one mile flat race by M.B. Subbiah in the year 1919 was broken by our Hockey captain M.B. Aiyanna who did the distance in good style and wind in 5′—29$\frac{4}{5}$″.

Several surprises were witnessed during the afternoon and we congratulate Hasunuddin khan on winning the 100 yards flat race and M M. Mandanna on winning the Hurdles and Long Jump events which were expected to fall to other competitors. It is a pity that in the Relay Race one runner forgot that he was merely a unit in his team and by giving up the race, thereby prevented the rest of his team from running.

Results.

The following were the results :—

(1)	100 yards flat race	1. M. Hasunudin khan–11$\frac{2}{5}$″ 2. M B. Aiyanna.
(2)	High Jump	1. M. Hasunudin khan–4′-7$\frac{3}{4}$″. 2. A. K. Bose.

(3)	Hurdle Race 120 yds	1. M M. Mandanna- $19\frac{4}{5}''$ 2. K A. Bhandary.
(4)	120 yds servants' Race	1. A Unni Nedungadi 2. Chinnaswamy.
(5)	$\frac{1}{4}$ mile flat racc	1. M. B. Aiyanna. 2. M. M. Mandanna.
(6)	Invitation $\frac{1}{2}$ mile	1. A Eling (Stanes school)–2′–27″. 2. Subba Rao (London Mission).
(7)	Sack Scrimmage	Winning Team :— 1. M.B.K. Molegoda. 2 A.A Arunachalam. 3. P.A. Venkataraman 4 Gurchan Singh. 5. S. Sankaran.
(8)	1 mile flat race	1. M B Aiyanna $5'–29\frac{4}{5}''$. 2. N.S. Poonacha.

(9)	Long Jump.	1. M,M. Mandanna–16′ 1″. (2) M. Hasunudin khan.
(10)	Visitors' children's Race	1. Miss. Gladys Dee. 2. John Dee.
(11)	½ mile flat race.	1 M.B. Aiyanna–2′ 30″, 2. Poonacha.
(12)	Obstacle Race	1. J K. Bodas. 2 B. Kotilingham.
(13)	Relay Race	Winning Team :— Ceylon & Coorg Students.

100 yards flat race for past students was not run this year as the required number of students (4 the least) were not present to run the race, as passed in the general meeting.

The following two students, Mr. M B. Aiyanna & M. M Mandanna won their athletic colours by obtaining the required number of points for the same

S. C. RAMALINGAM,

21-9-21. *Athletic Secretary*

Hockey Match.

The third Hockey match this year was played with the Agricultural College on 23-8-21 on their ground. In spite of the fact that the full strength of our team was not represented, we scored an easy win by 3 goals to 1.

Play starting at 5-25 p.m., our opponents made a swift run with fine passing among their forwards towards our ring and if not for the timely stroke by Dempta—the left ½ back-, the invaders would have found no difficulty in making their attempt a success. Dempta however gave sticks and a corner was declared against us which our opponents failed to score off.

M.M. Mandanna—our centre forward—with an able partnership of Hadi Hussain—outside left—took charge of the ball and made a fast run and clearly put the ball into the net of our opponents inspite of their good defence, and thus registered the 1st goal for us at 5-30p m. Being encouraged by his success he made another good attempt in which however he failed as he was doing it by himself Had he however sought his partner's help he would have found little or no difficulty in his 2nd attempt.

Balakram Anand who filled the place of full back vacated by one of the instructors fell on his left wrist while attempting to hit a ball, with the result that he broke his wrist and play had to be suspended for 5 minutes.

The Agricultural College captain kindly allowed us to play a substitute for the injured player. No further score was made during the reminder of the first half of the game.

Half Time.

2nd half starting at 6-5 p.m., our captain (M.B. Aiyanna) taking charge of the ball from the centre bully made a fast run and passed the ball with a strong drive to the opposite extreme wing. The ball was nicely received by our outside left—Hadi-Hussain—who in his usual style drove the ball towards the net, but it was well stopped by our opponents' goal keeper. From here our opponents made a fast unattacked run and their Inside-left succeeded in scoring their 1st goal making the game equal at this juncture. Had our right-half been more brisk than he was, our opponents could not have scored their first and the only goal in such an easy manner as they did.

The play at this time became very exciting and shortly afterwards our centre forward (M.M. Mandanna) showed a clever bit of his wrist work and in partnership with Hasunudin khan—Inside-left—registered the 2nd goal for us amidst much applause.

Our opponents having become desperate made a good attempt straight from the centre bully from which however they failed to score.

The play became faster and faster and in the middle of a hard struggle within our ring Bhandary—one of our full-backs—was badly hurt, and was compelled to leave the field though the play was not stopped on account of this. Taking advantage of this handicap our opponents pressed on us very much and kept the ball within our ring and had not N. S. Poonacha—our left half —gone in time to the help of the surviving full back, and driven the ball far away from our danger zone, our opponents would have managed to register their 2nd goal against us. Our forwards following the ball from this hit succeeded in breaking through our opponents' defence, and we hoped we were going to score another goal, but were pulled up owing to one of our opponents giving sticks.

Bhandary returned to his place in the field within a few minutes and seemed no worse for his injury.

M. B. Aiyanna (captain) now succeeded in making one of his usual fast runs and deposited the ball safely into our opponents' net, thus adding the 3rd goal to his side. Within the last 3 minutes of play we made yet another attack on their goal, thanks to another run by our captain who passed the ball to the centre forward but the latter missed his shot.

Havildar Kunnhu and N.S. Poonacha played well for their sides, and K.A Bhandary deserves special mention for the brilliant defence he put up for his side.

C. S. RAMALINGAM,
Athletic Secretary.

Investigation of a Sandal tree.

(Isolated 5 years ago for the purpose of testing the theory of Root-parasitism.)

Certain healthy sandal trees on the Javadies were trenched 5 years ago with a trench approximately $4\frac{1}{2}'$ deep and some $2'$ wide, excluding all other growth; the platforms so formed were carefully cleaned, all growth being uprooted and they have been kept weeded. This experiment was carried out by Mr. K. R, Venkataramana Ayyar, Rao Sahib, at the request of Mr. C. E. C, Fischer, then Principal of the Madras Forest College. Its object was to discover whether sandal is dependent on its

hosts for its existence or whether it can live alone in case of necessity.

For the first year or two the trees so treated appeared to be growing normally; then they began to show signs of ill health, the colour of the foliage became bad, and the leaves scanty, and whole branches in some instances died off.

This year, 1921, it was decided to investigate the condition of the root system of one particular tree that had been kept under careful observation by the Senior Division of the Madras Fosest College, which camps at Komattiyeri in the Javadies, every year

This tree was "No. 6" of the trenched trees in the Special Tending Area in Coupe I of the Komattiyeri Felling Series.

In 1919 and 1920 careful drawings of this tree were made from exactly the same spot, by Mr R, B. Cornwell, the Officer commanding the Senior Division of the Madras Forest College, showing the decrease in condition as regards quantity and quality of foliage. This year, 1921, another drawing from exactly the same spot has been made by Mr. M. R. Sundaram

Ayyar, Instructor in Sylviculture to the Senior Division, which shows that the tree has improved very considerably in condition. And this is the case as I can state from my own personal observation. Last year the tree appeared to be moribund. This year it appears to be fairly healthy.

I was surprised at the improved condition of the tree, as to my mind, it is obvious that a tree which naturally always forms root connections with other species will not thrive without such. I have never yet found a sandal tree that had not many such connections, and I have examined the root systems of several hundreds. I discussed the matter with Mr Sundaram Ayyar and we came to the conclusion that it was probable that the sandal tree had, in its search for hosts, driven its roots right down below the trench, contrary to its natural habit,—for the sandal is an eminently shallow rooted species,—and had so formed root connections with trees outside the trenched area. We proceeded to investigate, being assisted by the students of the College, and we found that our theory was nearly correct. The roots at first followed the usual habit of sandal and spread out a few inches below the surface of the soil, until they reached the edge of the trench, then they turned downwards, and in some cases returned a short distance on their course; two roots we exposed completely and they had burrowed to nearly the

depth of the trench when they came in contact with the roots of two trees growing outside the trenched area, and had immediately formed numerous root connections by means of the usual haustoria with these roots. In the one case they were attached to the roots of a big Chloroxylon Swietenia, 25 feet from the edge of the trench, and in the other to those of a small Eugenia Jambolana, some 3 feet from the trench.

It seems therefore, that we can see clearly what the life of this tree has been since it was trenched. For the first two years or so it remained stationary, existing on its reserves, and extracting a certain amount of nourishment from connections with the numerous small roots that must unavoidably have been left when clearing the platform. Then during the next two years *it* began to die slowly owing to lack of hosts. During all these four years it was making desparate efforts to find hosts, driving its roots deep down into the soil, and forming very many connections with its own root system in doing so. Of these we found many examples, in fact we did not come across a case in which two of the roots of this tree came into contact with each other without forming haustoria. I have frequently found the roots of sandal parasitic on another sandal but never before have I found them parasitic on the roots of the parent tree itself. The

desperate need felt by this tree for a host was further evidenced by the fact that a single small root of some foreign plant, which had inadvertently found its way on to the platform, had a sandal root lying along it connected by no fewer than 7 haustoria in a distance of 4 inches.

Well, at last the efforts to find hosts which had been made for 4 years by this tree were rewarded, and at a depth of some $3\frac{1}{2}$ to $4\frac{1}{2}$ feet it came in contact with the roots of the Choloroxylon Swietenia and Eugenia Jambolana referred to above, immediately seized on them and formed root connections with them, and immediately began to recover its health, thus accounting for its present improved condition.

As further evidence, if any is needed, of the necessity of host plants for the existence of sandal may be quoted the instance of another of these trenched trees. This was a young sapling in the compound of the old Rest House at Komattiyeri. This after a year or two showed unmistakable signs of dying; last year Mr. Abdul Qadir, the District Forest Officer, planted some Jatropha curcas beside it; this year the sandal sapling is in a flourishing condition.

To my mind then, apart from the fact that it is natural for it so to do, and therefore good it, it has been proved conclusively that sandal will not thrive without hosts

C. C. WILSON.

Contract system in Fuel coupes.

A novice, as yet, in the art, and practice of sylviculture, I quite feel my incompetence to write on this subject. Lest I should be thought too presumptuous, I, here, preface that I am just giving expression to some ideas which have struck me lately, as being worthy of a little consideration by men, better qualified than myself, and whose views matured, as they will be by experience, will prove highly instructive.

When a fuel coupe is sold in auction, the price it fetches depends upon the nature of the growing stock therein, the facility of its removal, and, to a great extent, also on the competition fo the bidders. Where this is keen, sometimes a very good price

is realised, but in no case does the Department suffer any loss on account of such sales. I know of a working circle which, according to its working plan, should be worked at a net loss, but is really fetching a net profit of some hundreds of rupees every year. This fact must surely cause a certain amount of agreeable surprise to its author.

The working of the forests of India, as one officer has remarked, is a semi-commercial concern in the management of which the same principles as are applied in any business enterprise shall also be applicable equally and well. Quite reasonable does this sound. But, the highest aim of the Government, nay, the greatest purpose for which it exists, and is suffered to exist, is to serve the greatest good of the greatest number. I believe, nobody will deny this statement. Judging from this standpoint how then, do we behave towards these greatest numbers in the matter of the fuel coupes? By selling these to the highest bidders, we leave the multitude to the mercy of the contractors whose main object is always to make the most of the bargain. They can never sell their stock like the Government at their cost price, but often put their profits as high as 25 and 30 per cent of their total outlay.

Not only this. The materials which they offer to the public are not often the best of their kind. Billets of all sizes

are mingled together without any sort of classification. When one, contractor takes 2 or 3 coupes in 2 or 3 adjacent felling series he does not open as many depots and near the villages or group of villages which are intended to be benifited by them in the first instance. What usually happens is that he removes the produce of all his coupes to one depot situated in or near his own village. This affects the small consumers often very badly.

In the details of his working too, the contractor very rarely fulfils all the conditions of his agreement, and I am sure that a perfectly satisfactory coupe is a rare exception. His coppicings are never above criticism. His billets are stocked at random on the whole coupe and wherever a tree has been felled. The carts that come to remove these do not confine themselves to one particular track, but are very often taken through the area to get at the scattered stacks. The soil is thereby badly ruptured, the seedlings on the ground are damaged, and the stools, and the coppice shoots in the earlier worked portions are also injured. Added to these, there is the danger due to grazing by the bulls and buffaloes belonging to these carts. Though these acts are prohibited in the agreement, in practice, it is very hard, to enforce them, and the occasional attempt of the subordinates to do so only lead to constant misunderstandings and ruptures with the contractor or his men.

There is yet another and a more serious feature of the working under this system. I refer to the heaps of branchwood and brushwood (often thorny), very irregularly scattered over the whole area, and

in such a way that it is practically impossible to make one's way through them inside the coupe. They are so badly and recklessly thrown, that it cannot be known how heavily they hinder the natural growth of seedlings on the ground, and how badly they suppress also the advance growth It sometimes also happens that the workmen cover their bad working with a mass of brushwood of this kind. The contractor cannot find sale for all this stuff; and he is therefore, not prepared to collect and stack them. Their presence will prove a source of serious danger in the Fire season; and especially so, if there happen to live in the vicinity some hot-headed incendiaries like those Moplahs of Malabar, who had, out of pure mischief, burnt down, not long ago, the buildings and some other belongings of the Govt. and of our Department in and round about Nilambur and Manjeri. It is therefore doubly necessary that all this easily inflammable material should be carefully collected and laid down along the coupe or strip lines, forming some sort of a fence round it. How much is its protection also facilitated thereby!

In consideration of these points, it seems to me, that the ultimate aims of Government in general, and of the Department in particular, would be better achieved by Departmental management than by the contract system. Our accounts are kept in a more open manner, and every purchaser can have access to them, if he suspects the price at the Depot. He has also the privilege of bringing any fraud or misdemeanour on the part of the subordinates to the higher authorities, who will instantly look into them, and remedy the defects, if any. Complaints against the contractors are not so easy to be dealt with.

One thing more to add, which is partly politics : and I hope to be excused for indulging in it here. All my readers know that the atmosphere of the whole of India is at the present moment surcharged with the unhealthy vapour of Non-co-operation. Propagandists are busy everywhere exhorting the people not to take part in any of the Government sales. Their attempts have not been successful so far neither can they succeed in ever rousing the peaceful millions of India whose safety, happiness, health, wealth and prosperity are for ever dependant on the stability of the established Government. Yet, it is only prudent that we should be prepared for a contingency of that kind, by taking back under our own control these and similar works, now being done by contractors. And for this, we have, surely, enough men, well trained in the technical details necessary for the purpose.

P. SITHAPATHI AYYAR,

M. F. C.

1920—22 Dn.

Gluta travancorica.

This is a Shola species; its growth is strictly confined to evergreen forests. It is known as *'Shenkurinchi'* in Tamil and derives its specific name *travancorica* probably from its abundance in the forests of Travancore. In the years past, this species seems to have been left in the back ground; its importance as a timber-tree is imperceptibly gaining ground and this fact is evinced by its growing demand in the locality in which it occurs. The winsome bright red colour of the heartwood, its comparative lightness coupled with its durability and above all its easy manipulation, have attracted the attention of cabinet-makers. One would really be enraptured at the beautiful sight of the straight, and stupendous stature of the Gluta boles with their gigantic girth and far spreading crowns, standing as they are in the midst of the Sholas. The virgin nature of the forest, the cooling green colour of the foliage, and the silvery sun peeping through the canopy of the stalwart Glutas infuse into the minds of the looker-on a spirit of happiness which is unique in its nature.

Gluta travancorica belongs to the order *Anacardiaceae*; its seeds yield a black acrid juice analogous to that found in divers other trees pertaining to this order. Botanically Gluta is next door to the mango. The early stages in the growth of the two species are almost identical. Both the young seedlings start life almost in a similar manner.

This species is commonly found in the Shcla forests of Kannikatty and Kodamady of Ambasamudram Range in the Tinnevelly Dt· The elevation that is cougenial to the growth of this species seems to be between 2000 ft. to 3000 ft. Besides Travancore, Gluta seems to occur in the Tinnevelly District near the higher Sholas almost bordering on the Travancore forests. In the Shola forests attached to the Ambasamudram Range, Gluta trees of great height are copiously found. Trees of 100 ft. height and 10 ft. girth are to be seen in those forests.

The seed requires about three months to strike a tap root of some appreciable length, say 6 inches and in the interim, there is hardly any growth above the surface of the ground. When the radicle is sufficiently established, the seed sends out a knitting-needle-like plumule which attains a length of about 6 inches in 6 or 7 weeks. Then the leaf-bud situated at the apex of the plumule slowly sprouts out into a whorl of leaves. This is all the progress which the plant seems to show in the first year of growth. Its pronounced tap-root precludes the seedling from planting but the seeds can be easily dibbled.

The period that is best suited for the dibbling of Gluta seeds in the Ambasamudram Range is between the middle of May and the middle of June. It is difficult to procure adequate seeds before May, and after June the heavy rains set in, and the dibbling operation cannot be effectively carried out owing to the presence of leeches. It is really an unpleasant task for coolies to labour in the forests with leeches swarming about on their legs drinking and wasting their warm blood. It is a painfnl sight to look at the coolies with the smoking blood oozing and

trickling down their legs and with the bloody leeches tenaciously clinging on to their legs. The labourers are likely to while away their time in pulling out these pests. It is rather hard to obtain coolies during rainy season. Besides it is not prudent to dibble during rains, as an old saying current among foresters, forbids, " Sow dry and plant wet "
In August the weather changes and then the dibbling may be done.

Natural regeneration is splendid where conditions of soil and climate are ideal. Under the older trees, seedlings in all stages and saplings in abundance can be seen, forming a thick carpet. In a typical plot of about one acre, about 7000 seedlings were enumerated. Seeds lying on the ground under the parent trees, germinate sooner than those collected, preserved for sometime and then dibbled.

Gluta seems an extreme light demander, wanting the maximum overhead light available. As a seedling, this thrives even in grassyland if the grass is prevented from suppressing it. The preference of shade may be due to the fact that it serves the double purpose of impeding the growth of grass and simultaneously preserving the richness of the soil with regard to humus, moisture and fertility and thus eventually stimulating and fostering the rapid growth of the plant. The leaves of some young seedlings, of about one year, in an open nursery, were observed to be yellowish and unhealthy. This may be presumably due to the fact that the seedlings require some shade to help them to tide over the first hot weather. The poles seem to be provided with terminal shoots to cut through the overhead cover to obtain their necessary light.

Leaves are 4 to 6 inches long and 1 to 2 inches broad, simple crowded at the ends of branches, rigidly coriaceous, spathulate, entire thick; subsessile, with pronounced veins; Gluta seems to blossom from February to April. Its inflorescence is in terminal panicles. Flowers are cream-coloured. Petals 4 to 6 and stamens also 4 to 6. Style is filiform; ovary is superior. The ripe fruit is probably formed about three months after flowering. The fruit is globose; it has a rough brownish rind and is about $1\frac{1}{4}$ inches in diameter. Seeds lying on the forest floor under one parent tree, were heaped up and measured and it was found that there were over 35 measures of seeds produced by one single Gluta tree, and one measure held about 84 seeds. Some of the seeds are small and others are big. From calculation, we derive the average volume of a seed * to be $1\frac{1}{3}$ cubic inches approximately. It is quite easy to pick out good healthy seeds from rotten unsound ones. If the dibbling of the seeds, is executed at four feet apart, then we require per acre 2722 seeds, which come to 32 measures. Now this number appears to be a fairly large one The seed yields a black blistering juice acid to the taste and this prevents animals from molesting the seeds unlike the sandal seeds which are to be guarded against rats, squirrels, pigs and birds.

[* The average volume of a Gluta seed is certainly much less than what is given The *fruit* has evidently been mistaken for the seed in the calculation referred to—Editor.]

Gluta seems to possess a tendency to form a straight clean bole surmounted by a spreading crown without branching lower down. In the forests, we meet with a number of dead and fallen trees in preference to other trees with which the Gluta is associated From this it follows as a corollary that this species. attains age earlier than the rest of the species This fact is likely to become corroborative, from the fact that Gluta is a light demanding species.

The age of exploitability is about 150 years. Its bark is smooth pinkish grey and about $\frac{1}{2}$ inch thick. Sapwood is white and the heart-wood is bright red. The latter is close-grained, beautifully streaked, and takes a fine polish after seasoning Its annual rings are quite distinct and are about 6 to 10 per inch. This handsome wood is generally found in inaccessible places and on high elevation So the transport of timber, is very difficult. This wood in the Government forests in the Ambasamudram range is not as yet for sale. Now the forest department is opening the forest by connecting a net work of roadways for the extraction of timber. When the project is over, wood will be found in the market for sale. At present, the Kattalaimalai estate belonging to the Jesuit Fathers, in the Ambasamudram range, in the Tinnevelly District, has this species in their forest and they cut and remove some good trees of Gluta to their depot at Uchankulam about 4 miles from the Ambasamudram railway station. They sell at Re 1 to Rs 2, per cubic foot. The wood is chiefly used for cabinet-making, for making light furniture, for inlaying, for making picture-frames and to some extent for carving. Carpenters find the wood easy to handle like teak.

The flaw about this wood is that it is amenable to the depredations of the white ants. These ants easily eat away the wood, despite the fact that it yields a blistering juice. It is also subjected to the attacks of a borer; sometimes the borer tunnels through from one extremity of the wood to the other. Sambhurs peel off the barks of the saplings of Gluta with their horns as the acid exudation probably helps to shed their horns the sooner. In the Gluta plantation at Kannikatty, we see some saplings whose barks are torn off owing to the same cause. This tree is receiving the attention of the forest department. In the long run, it may become one of the popular timber species that can be easily procured, owing to departmental enterprise.

S. Doraraja,
M. F. C, 1921—23 Dn.

Occasional Notes.

Dipavali Celebration in The Forest College Estate.

This all-India festival was observed with much mirth and gaiety in our little Estate on the evening of the 30th October, last. Hostel Blocks, and the students' Club were well illuminated in the familiar orthodox Hindu style, and a variety entertainment was got up for the evening's entertainment.

In response to our invitation, the staff and the students of the college and of our sister college of Agriculture, came to spend a pleasant evening with us. There were also some ladies in the front row of chairs. Mr. and Mrs. Wilson, and Mr. G. C Robinson of the Forest College, also honoured us by their presence.

The hall was well decorated, and when the guests arrived, they were received, and conducted to their seats by Messrs. Sundaram Iyer & E. K. Krishnan of the college, assisted by some of the students as well. Precisely at 5-30 P. M. the function began with the distribution of sandal, flowers, fruits, and pansupari to the guests. The performance on the stage included an interesting series of songs, both comic and serious, in a variety of languages A scene of drunkards exhibited by four students from the Punjab was also much appreciated.

These took us till 7-30 P. M. At the end of the show Mr. Sundaram Iyer, who organised the whole function of the evening, spoke in brief about the significance of the festival, and then thanked the guests for their ready response and sympathetic appreciation of the performance. Mr. Wilson of the Forest College, and Mr. Ramaswamy Sivan of the Agricultural college, returned the compliment on behalf of themselves and of the other guests of the evening.

The pleasant function then came to an end with the singing of the "Mangalam" and the National Anthem in English.

Out of the collections realised for the celebration we were able to spare a sum of Rs. 10 to the Malabar Relief Fund.

P. Sithapathi Iyyar,

M. F. C. 1920-22 Dn.

Miscellanea.

I. *(a) More about "Balsa" (the lightest wood in the world.)*

" *Balsa* is now on the American market for a variety of special uses that require boyancy, non-conductivity for heat, smoothness, softness, lightness, and speed in working. It averages in weight about one-third less than cork. This lightness results from its peculiar cellular structure. In its natural state, Balsa rots quickly and ordinary methods of preservation by painting or otherwise are ineffective in preventing deterioration. After extended experimentation in the treatment of Balsa, a process of wood preservation has been developed, which meets the requirements of Balsa, and its uses, giving adequate protection and permanency of quality to the wood. This process thoroughly impregnates all parts of the wood with a thin coating which does not appreciably increase its weight. Treated Balsa is water-resisting, and is not subject to the attacks of insects or the bacteria of decay.

Combined with its light weight and its quality of insulation against heat, Balsa possesses a structural strength, which, pound for pound, is greater than that of any wood.' (*Extracted from " The Modern Review " for September 1921.*)

I. *(b) Bamboo shoot and its uses.*

"A giant grass four inches thick that grows a foot a day until it is 50 ft. high—such is bamboo. Its sprouts rival the sweet corn in succulency and flavour; its towering stem will furnish timber to make furniture fans and fish rods tent poles, trellises, and tooth picks; its

graceful outlines and green and golden beauty rival that of the white birch.

" One plant will form a grove, for it grows and spreads much in the manner of its smaller cousin Asparagus It needs no cultivation whatever once it is established. An acre of bamboo will produce one thousand sprouts each year for 40 or 50 years

You first encounter Bamboo as an edible in that chinese dish known as Chop Suey. It is a morsel of firm, wholesome texture and delicate flavour cut from the tender sprout.

" The food value of the bamboo shoot is high (about equal to that of onion) In preparing the shoots for the table the brown outer husk is stripped off, the tender sprout sliced lengthwise, and boiled for an hour in salted water. It is served with drawn butter.

—*Extracted from The Modern Review for September 1921.*

[Note: There is another preparation familiar to people who have had some experience among the hill tribes of this part of India. The shoot is stripped of its outer husk and sliced into convenient size The slices are put in cold or lukewarm water and allowed to soak there for 24 hours after which they are taken out and cut into still smaller pieces. These are then cooked well with milk and sugar, or with salt only, in which case, spices are also added. This preparation forms a dainty dish on festive occasions.]

P. Sithapathi Iyer.

II. How Japanese Dwarf Trees Are Raised.

The little Japanese trees exhibited in the windows of the better radeg Japanese novelty shops never fail to excite considerble interest, because they are so unusual. In fact, in Japanese horticulture the art of landscape gardening on a miniature scale plays an important,

if not a leading rôle. A village or a single home, surrounded by beautiful country, will be formed within a plot of ground a few yards square by the Japanese artisans. A river with its bridges, a lake with tiny ships on its silvery surface, roads, gardens, fields—all these features are to be found in the more pretentious Japanese miniature works. Hence it is not surprising to learn that the Japanese, in order to carry out their miniature landscape gardening with the utmost realism and fidelity, have had to raise dwarf trees for this purpose.

So the custom of dwarf trees has become an established one in Japan, some of these trees attaining the age of 200 years. The whole system of culture of these tiny trees may be summed up as the reversal of nature's method. It really consists not in the survival of the fittest, but rather in the survival of the unfittest, so to speak. A poor, week seed is usually chosen and planted. As soon as it has attained some growth, the leading shoot is trimmed off. The little plant then grows two other shoots, and these are carefully watched. When one shoot exhibits a strength that is vitally greater than its fellow, it is at once cut off and the weaker shoot left untouched in order to form the future dwarf tree's main stem or trunk. This system of trimming and cutting is followed punctiliously. Water is seldom used—only in such small quantities as to keep the little plant actually alive. The tree is kept in a pot too small for its full development and the roots are constantly pruned. The shoots are carefully trained and bent to follow the growth of a large tree.

All of which, it goes without saying, requires great patience; but this is a commodity with which the sons of Nippon are endowed to a degree approached by few of the Caucasian races, and the Japanese horticulturist never tires of watching the growth of his tiny trees. When such a tree has been growing for about five years, it can be left

to take care of itself, since it has become accustomed through its training to follow the rigid course laid out for it, and can then be trusted not to strike out again in the pursuit of its natural size and vigor. In this manner magnificent specimens of dwarf trees are produced which compare favorably with anything found among their big brothers in the untrained forests of Japan.

Extracted from Scientific American for 11—6—21.

Contributions to the Gass Forest Musuem.

Serial No.	Contribution	Contributor.
1.	Root and leaf specimens of *Casearia esculenta*	M. R Ry. P. Sankuni Menon R. O. Dhoni.
2.	Root specimen of *Salacia prinoides.*	The Surgeon General with the Government of Madras.
3.	One French horn	F L. C. Cowley-Brown Esq. I. F. S.
4.	100 Botanical specimens 15 seedlings showing different stages in germination. 2 Fruit specimens, 2 Short panels each of 11 species of timber.	M R Ry. Rao Sahib. K. R. Venkataramanier avl. I. F. S. Forest Research Officer

5.	One mounted specimen of the *Indian Pangolin.*	J. H. Longrigg Esq. I. F. S.
6.	One long panel, one short panel and one block of *Xylia dolabriformis*	R. H. Mitchell Esq. D. F. O. Upper Godaveri.

Contributions to the Madras Forest College Library from 22-8-21 to 20-11-21.

A *General Library:—*

1. The sylviculture of Indian trees – 3 copies— *By R. S. Tro-pe M. A., C. I. E.*

2. Code for the collecting & tabulation of statistical data—*By S. H. Howard B. A*,

3. The Madras Treasury manual. Vol. I Third edition.

4. Structural Botany Vol. I—*By Asa Gray.*

5. Text Book of Botany (Indian edition)—*By Lawson and Willis.*

6. The fauna of British India; Vol. III.

7. Memoirs of the Indian Museum; Vol. V. Fauna of Chilka Lake No. 9 (September 1921)

8. A hand book of some South Indian Grasses—By Rai Bahadur, K. Rangachariar avl. M. A , L. T ,

9. Inland trade of India—(1919-20.

10. Revised working plans for (1) The upper Hill Forests of the Darjeeling Forest Division & (2) The Kulu Forests for 1919-20 to 1943-44.

11. Working plan for Buxa Dn. Bengal Forest Circle.

12. Indian Forest Records; Vol. III Part I.

13. The common Birds of Bombay II edition.

14. Civil Account Code; Vol I. 8th edition.

15. Moore"s Family Medicine; revised edition 1921.

B Students' Library.

1. Miscellaneous writings & speeches (*By Lord Macaulay*).

2. Vanity Fair—*By. Thackeray*.

3. The Boy's book of health & strength—*By Garden Stables M. D.*

4. The optimistic Life—*By Marsden*

5. The Modern Letter-Writer.

6. The Elements of Book-keeping—By K. Subramania Ayyar B. A., L. T ,

7. The Theosophist—*By Annie Besant.*

Students' Club Fund

Statement showing amounts promised and still due by old students, towards the Students' club:—

			Rs.	A.	P
Mr.	C. S. Ramanathan	....	10	14	0
,,	M. R. Doraiswami	... ...	3	0	0
,,	Kerala Varma	... ...	10	0	0
,,	Gulam Dustagir	... .	9	0	0
,,	S A. Dawson	... ...	11	0	0
,,	N. T. Tambi	... ...	4	0	0
,,	P. Karunakara Menon	... ...	9	0	0
,,	Dhananjeya Rao	... ...	13	0	0
,,	Kesava Pillai	... ...	12	0	0
,,	I. Ramalingam	... ...	8	0	0
,,	L. A. Krishna Ayyar	... ...	7	0	0
,,	S. Krishna Ayyangar	... ...	15	0	0
,,	T. K. Parameswaram Pillai	...	15	0	0
,,	P. Krishnan	... ...	10	0	0
,,	T. E. Varadhachari	... ...	15	0	0
,,	K. G. Sundararaja Rao	...	10	0	0
,,	M Krishna Ayyar	... ...	10	0	0
,,	S. V. Sigbhatullahi	... ...	10	0	0
,,	Gulam Rassool	... .	10	0	0
,,	T. R. Naganatham	... ...	10	0	0
,,	W. Balakrishna Mudaliar	...	10	0	0
,,	Aiyappa Asari	... ...	15	0	0
,,	D. Patel	... ...	18	0	0
,,	K. Jayaraman	... ...	12		0
,,	P. V. Ramanna Rao	....	12	0	0
,,	R E. Lemos	... ...	50	0	0

Gazette Notifications.

23rd Aug. 1921.

(1) M. R Ry. A. Raju Nayakar Avergal, District Forest Officer. Central Salem Division, is granted privilege leave for three months with effect from date of relief.

(2) M. R, Ry. V. Narayana Ayyar Avergal E. A. C. of Forests, on return from leave, to be D. F. O. Central Salem Division.

(3) Saiyid Abdul Qadir Sahib Bahadur, E. A. C. of Forests, and D. F. O. South Vellore, to continue in additional charge of West Vellore Division.

(4) Mr. R. Bourne, Dy. Conservator of Forests, Instructor at the Forest Research Institute and College, Dehra Dun, is granted privilege leave for six months, combined with furlough on average salary for 4 months and furlough on half average salary for 5 months, with effect from the 15th September 1921 or subsequent date.

13th Sept. 1921.

(1) Mr. T. Clear, Dy. Conservator of Forests, has been permitted by the Secretary of state to return to duty.

(2) Mr. T. Clear, on return from leave to be District Forest Officer, Guntur.

(3) Mr. D. L. Sathe Dy. Conservator of Forests, on relief by Mr. Clear to be D. F. O. Lower Godaveri, *Vice* Mr. F. A. Seager proceeding on leave.

General notification:— The present Arcot Range of North Vellore Division, will be known henceforth as the Vellore Range.

4TH OCT. 1921.

(1) Mr. B. K. Roy, Assist. Conservator of Forests is granted combined privilege leave and furlough for 28 days with effect from date of relief.

(2) Mr. D. L. Sathe, Deputy Conservator of forests is granted privilege leave for 2 months with effect from date of relief.

(3) Mr. R. H. Mitchell, D. F. O. Upper Godaveri Dn. to hold charge until further orders, of the Lower Godaveri Dn. in addition to his own duties vice. Mr. F. A. Seager proceeding on leave.

This cancels the Notification in the Gazette of 13th September 1921.

11—10—1921.

M. R. Ry. A. R. Narasimha Ayyangar avl, Extra Assistant Conservator is granted privilege leave for two months and fifteen days in continuation of the leave already granted to him.

Mr. B. F. Rigold Deputy Conservator of Forests has been granted by the secretary of state an extension of furlough on Medical Certificate by one month, and permitted to return to duty at the end of it

25—10—1921.

(1) Mr. F. R. Madan on return from leave, to be D. F. O. South Mangalore.

(2) Mr. G. S. Lasrado on relief by Mr. F. R Madan, to be D. F. O. North Mangalore.

(3) The Item in the Notification of the Gazette of 3rd May 1921 appointing Mr. H. C. Bennet as acting Conservator of Forests (Seconded), is cancelled.

1—11—1291.

Mr. B F. Rigold, Deputy Conservator of Forests, on return from leave, to be District Forest Officer, Upper Godaveri Division.

Mr. R. Mitchell, Extra Assistant Conservator of Forests, on relief by Mr. Rigold, to be District Forest Officer, Lower Godaveri Division.
(Sir George Hart, K. B. E, C. I. E, Inspector-General of Forests, is permitted to retire with effect from the 14th October 1921.

From the same date, Mr. P. H. Clutter-buck, C. I. E., C. B. E., officiating Inspector General of Forests, is confirmed in that post.

8—11—1921.

M. R. Ry. P. Venkataramanan Avergal, District Forest officer, East Salem Division, privilege leave for two months with effect from date of relief with permission to affix the Christmas and new year holidays to his leave subject to the conditions of article 220 of the C. S. R.

M. R. Ry. A. Hanumantho Rao Avl. E. A. C. of Forests, extension of privelege leave for two months in continuation of the privelege leave for four months already granted to him.

M. R. Ry. B. S. Kasava Vittal Avl. E. A. C. of Forests, extension of privelege leave for sixteen days and furlough for one month and seven days in continuation of the leave already granted to him.

18—11—1921.

Mr. F. D Ardagh, Assistant Conservator of Forests, to act as District Forest Officer East Salem Division, *vice* Mr. P. Venkataramanan, granted leave.

Mr. A, Raju Nayakkar. E. A. C. of Forests, on return from leave, to be District Forest Officer Central Salem Division.

Mr. V. Narayana Ayyar, District Forester, Central Salem Division, on relief by Mr. A. Raju Nayakar, to be District Forest Officer West Vellore Division.

Notifications relating to range officers:—

First Circle.

15—8—21

1. M. R. Ry. B. S. Sankara Iyer, Ranger VI grade, Godavari Upper is granted privilege leave for one month with effect from 10th September 1921 or date of relief.

22—8—21.

2. (1) M. R. Ry. B. V. Nagarajan, Ranger III grade, on reinstatement is posted to Upper Godavari division for the charge of the Cherlah Range.

(2) W. E. Timasfieldt, acting Ranger VII grade will revert to his permanent post of Forester I grade with effect from date of relief by No. 1.

26—8—21.

3. M. R. Ry. N. L. Narasimham Pantulu, Ranger IV grade, Kurnool East division, is transferred from the II to I Circle for the charge of the Sarvasidhi Range, Vizagapatam district on relief by Y. Pedalakshamayya Naidu Ranger VI grade transferred from the I to II Circle

27—8—21.

4. In supercession of this office S. O. No. 59 of 21 dated 26—8—1921, M. R. Ry. N. L. Narasimbam, Ranger IV grade is posted to the Narasapatam Range of the Vizagapatam District on relief in the Second Circle.

28—8—21.

5. Under Article 260 of the C. S. R. M. R. Ry. Y. Venkataswami Naidu Ranger VII grade, Vizagapatam District, is granted privilege leave for three months with effect from date of relief.

29—9—21.

6. (1) M. R. Ry. I. Ramamurti, Acting Ranger VII grade is transferred from the Vizagapatam to Ganjam district for the charge of the Bontha Range.

(2) M R. Ry. C. T Tiruvengadam Ranger V grade, Ganjam, is granted privilege leave for three months with effect from date of relief by No. 1 under article 260 of the C. S. R.

8—10—21.

7. (1) [Mr. C. R. F. Williams, Assistant Conservator of Forests Lower Godavari is posted to the Rajahmundry Range.]

(2) M. R. Ry. G. Appa Rao, Ranger V grade on relief by Mr. Williams is posted to Ellore Range, Kistna District.

8—10—21.

8. M. R. Ry. P. V Subbaramayya, Ranger IV grade, Kistna District, is granted privilege leave for 4 months and 11 days and furlough on half average salary for one year four months and sixteen days in continuation thereof with effect from date of relief by Ranger G. Appa Rao Naidu.

15—10—21.

9. The privilege leave for one month granted to M. R. Ry. B. S. Sankara Iyer Ranger V grade in this office S. O. No. 53 of 21 dated 15-5-20 is extended by 15 days.

20—10—21.

10. (1) M R. Ry. B. S. Sankara Iyer, Range officer, Marrigudem Range, Godavari Upper, is transferred to Ellore Range, Kistna District to join on expiry of his privilege leave.

(2) The transfer of Ranger M. R. Ry. Appa Rao to Ellore Range, Kistna District ordered in this office S. O. No. 66 of 21 dated 8—10—21 is cancelled.

31—10—21.

11. The transfer of M. R. Ry. B. S. Sankara Iyer, Range officer to Ellore Range, ordered in this office S. O. No. 68 of 21 dated 20-10-21 is cancelled. He should assume charge of Marrigudem Range, Godavari Upper Division.

24—10—21.

12. Under articles 260 and 322-327 of the C. S. R. M. R. Ry. T. E. Varadachari, Ranger IV grade is granted privilege leave for three months and eight days and furlough on full average salary for 22 days in continuation thereof with effect from 24th August.

Second Circle.

3—9—21.

1. The following transfers of Rangers are ordered.

(1) M. R. Ry. N. L. Narasimham Pantulu, Ranger VI grade. Gudem Range, to charge of Narsapatam Range, Vizagapatam District. I Circle.

(2) Ranger Y. Peddalakshmryya Naidu of I Circle to take charge of Gudem Range, Kurnool East Division.

8—9—21.

2. (1) Reference:--Chief Conservator's Proceedings Mis. No. 388 dated 1—9—21 reducing on appeal the punishment of removal from service awarded to M. R. Ry. T. Sreenivasa Rao, V Grade, Kurnool West to one of reduction to the bottom of the V. Grade.

(2) M. R. Ry. T Sreenivasa Chari, Ranger V Grade who has been reinstated on appeal by Chief Conservator is posted to Gunter District To work under the orders of the District Forest Officer Guntur.

8—9—21.

3. Mr. Abdul Hussain Kirmani Sahib, Ranger 4th Grade in charge of Madakasira Range, Anantapur District is reduced to V Grade with effect from 7—9—21.

27-9—21.

4. (1) M. R. Ry. C. Ramasawmi Naidu, Ranger II Grade in charge of Palnad Range of Guntur District is granted privelege leave for 2 months from date of relief.

(2) M. R. Ry T. Sreenivasachari, Ranger V grade now working in Palnad Range is posted to the charge of Palnad Range in relief of No. 1 granted leave or until further orders.

19—10—21.

5. The following postings of Rangers and grant of leave are ordered.

(1) Ranger C. G. Ganapathy on return from leave (21—11—21) is posted to Bookapatnam Range Anantapur District.

(2) Ranger T. K. Ramaswamy Aiyar on relief by No. 1. is posted to Sirvel Range, Kurnool South Division.

(3) Ranger H. Rama Rao on relief by No. 2 is granted privilege leave for two months.

Third Circle.

3—9—21.

1. (1) M. R. Ry. L. R. Narayana Ayyar Ranger III Grade in charge of Odugathur Range, North Vellore District is granted sick leave on Medical certificate for 3 months with effect from 16th August the date of his absence from duty.

(2) M. R. Ry N. Swaminatha Ayyar Ranger I grade in charge of Arcot Range North Vellore District to be in additional charge of Odugathur Range of the same District as a temporary measure.

(3) M R. Ry. S. Vasudeva Reddy Ranger I grade on special duty under the orders of the District Forest Officer, Nellore is posted to the charge of Odugathur Range North Vellore District, in relief of No. 2 to join expeditiously, after relief.

4—9—21.

(1) M. R. Ry. K. Raghuraman probationary Ranger on special duty under the orders of the District Forest Officer South Cudappah District is posted to the charge of Sriperumbubur Range Chingleput District in relief of Mr. H. Mac Bride posted to Chittoor Disdrict.

4—9—21.

(1) M. R. Ry. T. S. Narayanaswami Chetty Ranger VII Grade is granted a further extension of leave without allowances for 2 months in continuation of the leave already granted in this office S. O. No. 61/21 dated 3rd June 1921 and 74/21 dated 1st July 1921.

21—9—21.

4. (1) Mr. J. M. Abraham Ranger IV grade in charge of Vempally Range west Cuddapah District and posted to the additional charge of Sanipaya Range of the same District in this office service order No. 83/21 dated 15—7—21 is permanently transferred to hold charge of the latter Range.

(2) M. R. Ry. C. R. Rajagopalan Ranger VI grade in charge of Sanipaya Range west Cudappah on return from leave granted in this office S. O. No. 83/21 dated 15—7—21 and 94/12—8—21 is posted to the charge of Vempally Range of the same District.

21—9—21.

5. The following transfers are ordered:—

(1) M. R. Ry. D. Krishnaswamiah Probationary Ranger on special Sandal wood duty in Chittoor District, is transferred to West Cuddapah District for a period of two months and posted to the special duty of verification of certain Reserve Boundaries in Kondapuram Range under the orders of the District Forest Officer West Cuddapah District.

24—9—21.

6. The privilege leave for 15 days granted to M. R. Ry. L. Govindaswamy Pillai Ranger VI grade under orders of transfer to the charge of Sriperumbudur Range Chingleput District in this office S. No. 63 dated 6th June 1921 is extended by one month.

27—9—21.

7. M. R. Ry. C R. Rajagopalan Ranger VI grade West Cuddapah District is granted a further extension of privilege leave for 25 days in continuation of the leave already granted to him.

3—10—21.

8. M. R. Ry. T. Paramasivam Pillai Ranger V grade on return from the three months privilege leave granted to him in this office service Order No. 54 of 1921 dated 15—5—21 is posted to the charge of Vempalle Range West Cuddapah District in relief of Mr. J. M. Abraham Ranger IV grade now in additional charge of Saniyappa Range of the same district.

8—10—21.

9. Ref:—Chief Conservator's Proceedings Mis. 435 of 1921 dated 4—10—21.

The following promotions of Rangers are ordered with effect from the 1st of September 1921:—

(1) M. R. Ry. L. R. Narayana Ayyar Ranger North Vellore District from III grade permanent to II grade Sub-protem.

(2) M. R. Ry. K. R Krishna Ayyar Ranger Nellore District from IV grade parmanent to III grade Sub-protem.

(3) M. R Ry. L. Govindaswamy Pillai Ranger Chittoor District from VI grade to V grade Sub-protem.

10—10—21.

10. M. R. Ry. C. R. Rajagopalan Ranger VI grade West Cuddapah District is granted a further extension of Privilege leave for 15 days in continuation of the leave already granted to him.

10—10—21.

11. M R. Ry. T. S. Narayanaswami Chetty Ranger VII on return from extension of privelege leave (on 20th October 21 granted to him in this office S. O. No 103 of 21, is posted for special duty under the orders of the District Forest Officer South Cuddapah District, Cuddapah.

28 10—21.

12. M. R. Ry., L. Govindaswamy Pillai Ranger V grade (Sub—protem) on return from the 1 month and 15 days Privilege Leave granted in this office Service Order Nos. 63 dated 6th June 1921 and 106/21 dated 28th September 1921 is posted to the charge of Vellore Range North Vellore District. This cancels his posting to the charge of Sreeperumbudur Range, Chingelput District ordered in this office Service Order No. 81/21 dated 12th July 1921.

2. M. R. Ry., N. Swaminatha Ayyar Ranger I Grade (Sub—protem on relief by No. 1 is posted to the charge of Sreeperumbudur Range, Chingleput District.

1—11—21.

13. In modification of this office Service Order No. 84/21 dated 21st July 1921, Mr. E. W. Fernandez, Ranger V grade, Chittoor District, is granted Privilege Leave for three months with effect from date of relief (31st July 1921 afternoon).

15—11—21.

14. The 3 months leave on Medical Certificate granted to Ranger M. R. Ry. L. R. Narayana Ayyar in this office Service Order No. 101/21 dated 3rd September 1921 is commuted into furlough for 3 months on full average salary under article 322 Civil Service Regulations.

10—11—21.

15 M. R. Ry. T. S. Narayanaswami Chetty Ranger VII grade is granted a further extension of leave without allowances for 2 months with effect from 21st October 1921 in continuation of the leave granted in this office Service Order Nos. 61 of 21 dated 3rd June 1921, 74 of 21 dated 1st July 1921 and 103/21 dated 4th September 1921.

10—11—21.

16. Mr. E. W. Fernandez, Ranger, Chittoor District, will be considered to have been under suspension for 1 month from the date of expiry of his leave and will be reduced from the 5th to the 6th grade for a period of 6 months or until such time as he shows himself fit to be restored.

The period of reduction will begin from the date on which he returns to duty.

10—11—21.

17. Razvi Sahib Ranger IV grade is granted an extension of furlough as follows:—

Furlough on full pay 1 month and 5 days.

,, on half pay 1 month and 25 days in continuation of the leave already granted to him in this office Service Order No. 89/21 dated 7th August 1921.

11—11—21.

18 M. R. Ry. K Raghuraman Probationary Ranger in charge of Sreeperumbudur Range, Chingleput District on relief by M. R. Ry. N. Swaminatha Ayyar is posted for special duty to work under the orders of the District Forest Officer North Vellore District.

Fourth Circle.

3—8—21.

1. M. R. Ry. D. Sreenivasa Achar, Ranger IV grade is granted privilege leave from date of relief till 14th October 21 inclusive preparatory to retirement. He has to retire on 15th October 21 under the age-rule.

7—9—21.

2. M. R. Ry S. Nagalingam Pillai Supernumerary Ranger, South Salem Division, is posted to the charge of Vaiyampatti Range of the same Division. vice Ranger D. Srinivasachari granted leave or until further orders.

3 The 6 months combined leave (Privilege leave 4 months and 2 months furlough on medical certificate) from 12—2—1921, granted to M. R. Ry. S. Ramanujam Sesha, Ranger IV in this office Service order Nos. 84-21, dated 22—5—1921 and 124, dated 26—7—1921, is further extended by one month.

11—9—21.

4. (1) M. R. Ry. S. V. Nagalingam Pillai, Supernumerary Ranger, is is posted to the charge of Nammakkal Range, to take charge at once from No 2.

(2) M. R. Ry. S. G. Venkataramana Ayyar Range officer, Namakkal on relief by No. 1 is transferred to Vaiyampatti Range. To proceed soon after relief.

(3) M. R. Ry. D. Strinivasachari, Range officer, Vaiyampatti, on relief by No. 2, is to avail leave preparatory to retirement which was sanctioned in Conservator's S. O. No. 137 of 1921, dated 30-8-21.

20—9—21.

5. M. R. Ry. T. V. Govinda Rao, Ranger V grade, on return from leave is posted to east Salem Division on special duty in connection with the verification of boundaries of certain reserves in Harur and Atur Ranges.

30—9—21.

6. M. R. Ry. K. Jayarama ayyar, Ranger VI grade, South Vellore Division is transferred to West Vellore for the charge of Chengam Range vice M. R. Ry. M. Packyanatham Ranger, granted laave.

30—9—21.

7. M. R. Ry. M. Pakyanatham, Ranger II grade in charge of Chengam Range is granted privilege leave on Medical certificate for 6 months from date of relief.

17—10—21.

8. (1) M. R. Ry. P. A. Krishnaswami Mudaliar, Ranger V grade, on Spike duty, North Salem Division, is posted to the charge of Denkanikota Range.

(2) M. R. Ry. S. Nageswara Ayyar, Supernumerary Ranger on Sandalwood operations, North Salem Division, is posted to Spike duty, Vice No. 1.

(3) M. R. Ry. S. Ramalingam, Supernumerary Ranger, East Salem Division, is transferred to North Salem Division for special duty, Vic No. 2.

10—10—21.

9. M. R. Ry, R. Thangavelu Pillai, Supernumerary Ranger, is granted privilege leave for 20 days from 24—9—1921. The casual leave already granted, is cancelled.

20 -10—21.

10. Ranger S. Doraiswami Ayyar will be reduced from the 5th grade to the 6th grade for a period of 6 months with effect from 1—11—1921 and will then return to the 22nd place in the 5th grade.

23—10—21.

11. The period of 1 day on 14—10—1921 overstayed by M. R. Ry. R. Thangavelu Pillai, Supernumerary Ranger, is treated as privilege leave in continuation of the leave already granted to him.

6—11—21.

12. M. R. Ry., S. Shanmugakumaru Pillai, Ranger II grade, Central Salem Division, now in Fifth Circle, Coimbatore, will be reduced temporarily by one grade for 6 months and will then return to the place on the list No. 11 in the second grade which he now occupies.

Fifth Circle.

12—9—21.

1. M. R. Ry., S. M. Krishnaswamy Aiyar, Ranger IV grade, Tinnevelly is granted furlough on full average salary for 1 month, from 13—8—1921, in continuation of the 3 months' Privilege leave granted to him in this office S. O. No. 58 and 85 of 1921,

30—9—21.

2. M. R. Ry. P. Ramaswamy Ayyar, Ranger V1 grade, is granted privilege leave from 15th July 1921 to 25th September 1921 (both days inclusive.)

30—9—21.

3. Probationary Ranger, P Sankunni Nayar, on special duty in Madura District, is transferred to VI Circle and should proceed at once and report himself for duty before the District Forest Officer, North Manglore.

14—10—21

4. Reference:— Madura District Forest Officer's No. 1632—C, 1921 dated 1st October 1921 submitting for approval s. o. granting extension of Privilege leave for 1 month. from 1--10—1921, to M. R. Ry, P. Sankunni Nayar, Probationery Ranger.

Approved.

14—10—21.

5. Mr. K. Chaikku, Ranger VII grade, is granted furlough on half pay for 1 month, from 27—9—1921, in continuation of the Privilege leave for 3 weeks, already granted to him, from 6th September 1921.

23—10—21.

6. The privilege leave from 15th July 1921 to 25th September '21 granted to M. R. Ry. P. Ramaswamy Aiyar, Ranger, VI grade, Madura District in this office S. O. No. 101 of 1921, dated 30th September '21 is extended by one day.

2—11—21.

7. M. R. Ry. T. V. Thayuman Mudaliar, Ranger, VII grade, is granted combined leave for 4 months and 3 days, from 12th June 1921 (Privilege leave for 4 months and 1 day and furlough on full pay for 2 days).

The furlough on half pay granted to Mr. K. Chaikku, Ranger, VII grade, South Coimbatore Division in this office S. O. 105 of 1921, dated 14th October 1921, is extended by 5 days.

Sixth Circle. *Leave.*

8—8—21.

1. Mr J. A. Aranha Ranger I Grade is granted Combined leave from 19—11—21, privilege leave for 3 months and furlough on average salary for one month and 18 days.

2. M. R. Ry. K. L. Govindakrishna Ayyar, Ranger VI grade is granted privilege leave for 2 months with effect from 1st July 1921.

25—8—21.

3. The furlough on medical certificate for 1 month from 9—5—21 granted to Ranger, Karunakaram Nambiar by the District Forest officer, S. Mangalore in this office S. O. No. 49,21 dated 7—6—21 is extended by 5 days ordinary furlough.

27—8—21.

4. M. R. Ry. K. Appiah, Ranger VII grade and sub protem VI Grade is granted, under article 260. C. S. R. privilege leave for 2 months from 1st September 1921.

1—9—21.

5. (1) Mr. B Coates, Ranger, VI Grade is considerd to have been on privilege leave for 1 month and 2 days under article 260. C. S. R. with effect from 13 th June 1921.

(2.) Wynaad District Forest officer's S. O. No. 82 dated 27—5—21 granting him 1 month's leave is cancelled.

3—9—21.

6. The 3 month's privilege leave from 29—11—20 granted to M. R. Ry N. Gopalan Nair, Ranger VII grade in the V Circle Conservator's S. O. No 10.21 dated 12—1—21 is extended by 17 days.

13—9—21.

7. Ranger K. R Krishnan Nair will be considered as having been on speciel duty at Nilambur from 27th to 29th July 1920.

27—9—21.

8 In modification of S. O No. 42,21 dated 8—8—21 M. R. Ry. K. L. Govindakrishna Ayyar, Ranger VI grade is granted Combined leave for 8 months from 1—7—1921, ie privilege leave for 2 months and 13 days & furlongh on average salary for 5 months and 17 days.

3—11—21.

9. The privilege leave for two months granted to M. R. Ry. S. V. Doraiswami Ayyar Supernumerary Ranger in this office S. O. No. 23.21 dated 6—5—21is extended by 15 days.

8—11—21.

10. The privilege leave for 2 months from 16—9—21 granted to M. R. Ry, K. Appiah, Ranger, VI Grade Sub protem in this office S. O. No.46.21 dated 27—8—21 is extended by 1 month and 9 days with permission toaffix the Christmas holidays.

Postings and transfers of Rangers.

12—8—21.

11. M. R. Ry. M. N. Raman Pillai, Ranger, V grade, Palghat division is posted to Nilambur division as assistant Ranger in one of the Ranges· To join on relief.

30—8—21.

12. Probationary Ranger Doraiswami Ayyar is posted to Ootacamund Range, as a temporary measure *Vice* K. Appiah granted leave to Join at once.

30—9—21

13. M. R Ry. A. P. Sreenivasa Ayyangar, Ranger IV grade N. Mangalore is transferred to the V Circle, Madura District, to report himself to the District Forest officer for orders.

2. Probationary Ranger, P. Sankunni Nair, is posted to N. Mangalore He will Join duty on expire of a months privilege leave which he has avayiled himself of from 1—9—1921.

6--11—21.

14. The following transfers of Rangers are ordered.

(1) Mr. B Coates, Ranger VI grade, from Begur Range to Uppinangadi Range. To work under the Range officer To Join on relief.

(2) M R. Ry. M. N. Raman Pillai, Ranger IV Grade sub protem to charge of Begur Range. To Join at once.

(3) Mr. J. S. Rowland, Ranger, IV grade from Nilambur Range to charge of Kannoth Range. To Join at once.

(4) M. R. Ry. P. Kannan, supernumerary Ranger, to on special duty in Begur Range. To Join on relief.

12—11—21

15. The following transfers of Rangers or ordered.

(1) M. R. Ry. K Karunakaran Nambiar, Ranger IV grade on Research duty Nilambur to special duty in Palghat division.

M. R. Ry. A. G. Jesudasan Pillai, Ranger, V Grade to Mangalore Range on return from leave.

12—11—21.

16. M. R. Ry. C. Vasu, Ranger, VI Grade, on special duty, Nilambur Range to charge of Mangalore Range. To Join at once.

Promotions of Rangers.

17. Chief Conservator's proceedings Mis No. 435 dated 4—10—21.

The following appointments and promotions of Rangers are ordered with effect from 1st Sept 1921 in existing vacancies.

To II Grade sub protem

M. R. Ry. A. Swamikutht, Ranger III grade.

To III Grade sub protem.

M. R. Ry. K. R. Krishna Nair Ranger IV Grade.

To IV Grade sub protem.

Messrs. H. Myers, & M. N. Raman Pillai, Rangers V Grade.

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Carallia integerrima	Machilus macrantha
Dillenia indica	Michelia Champaca
Diospyros tomentosa	Premna tomentosa
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Diospyros ebenum	Sterculia villosa
Dalbergia sissoo	Sterculia guttata
Erythroxylon monogynum	Stereospermum chelonoides
Gmelina arborea	Tetrameles nudiflora

* * *

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2. Volume 6 for 1880 - 81.
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13. Volume 44 for the year 1918 - March number.

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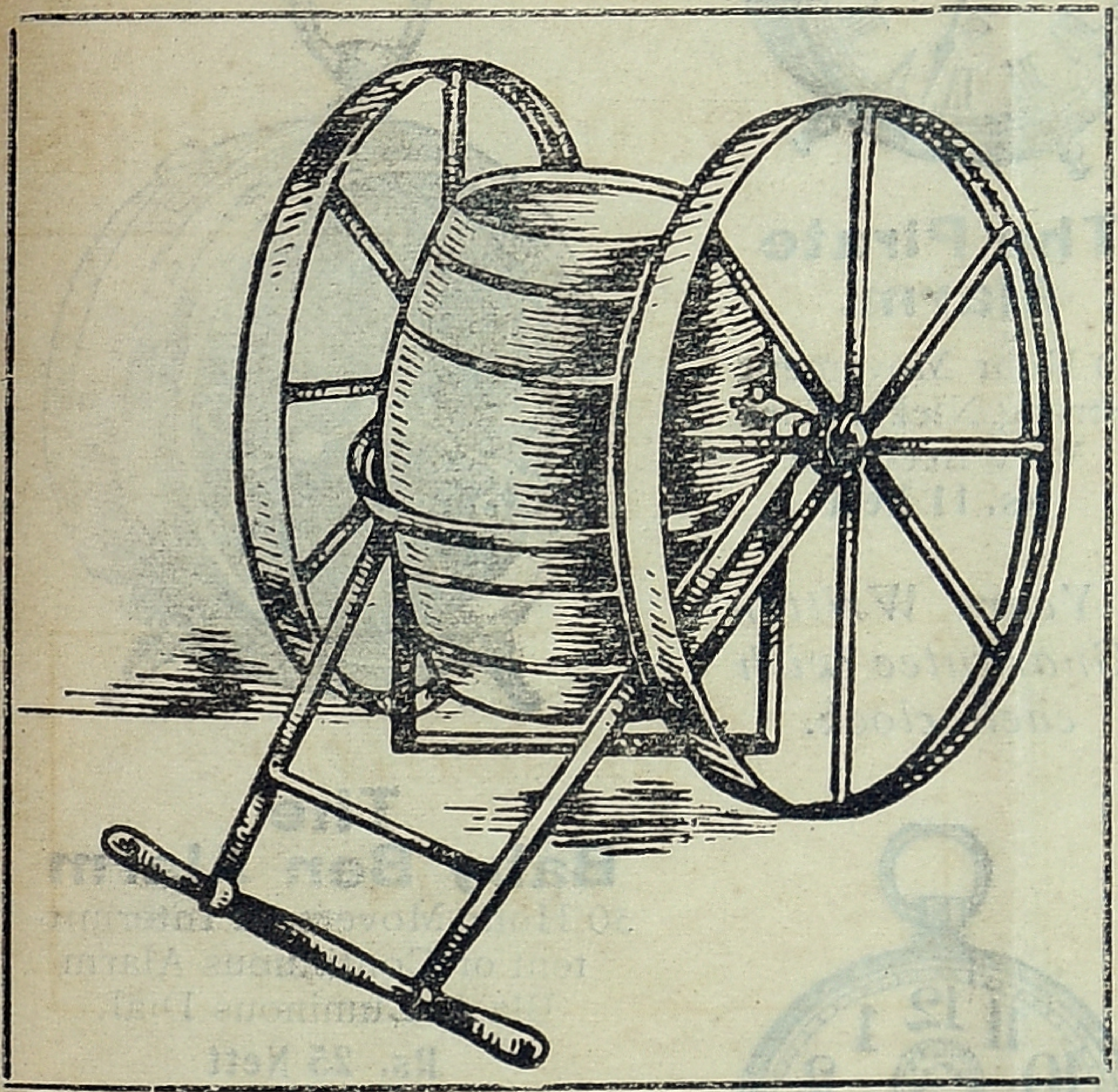

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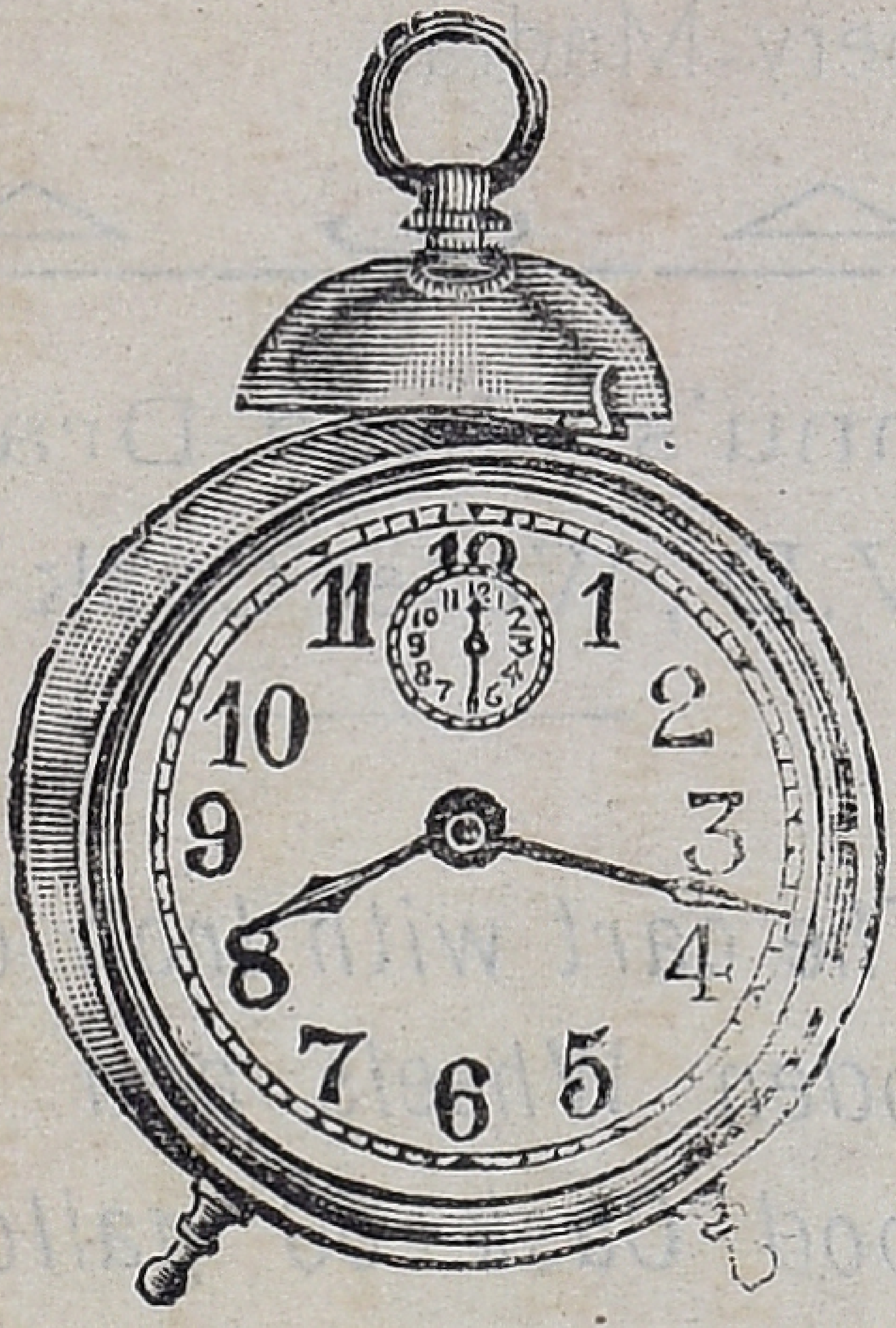

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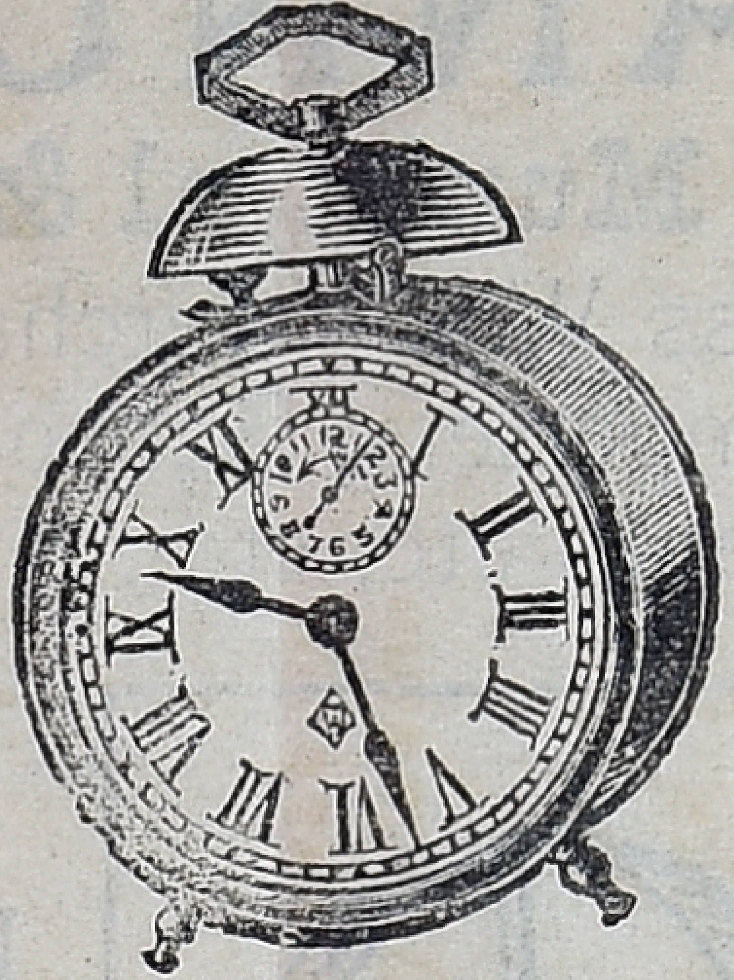

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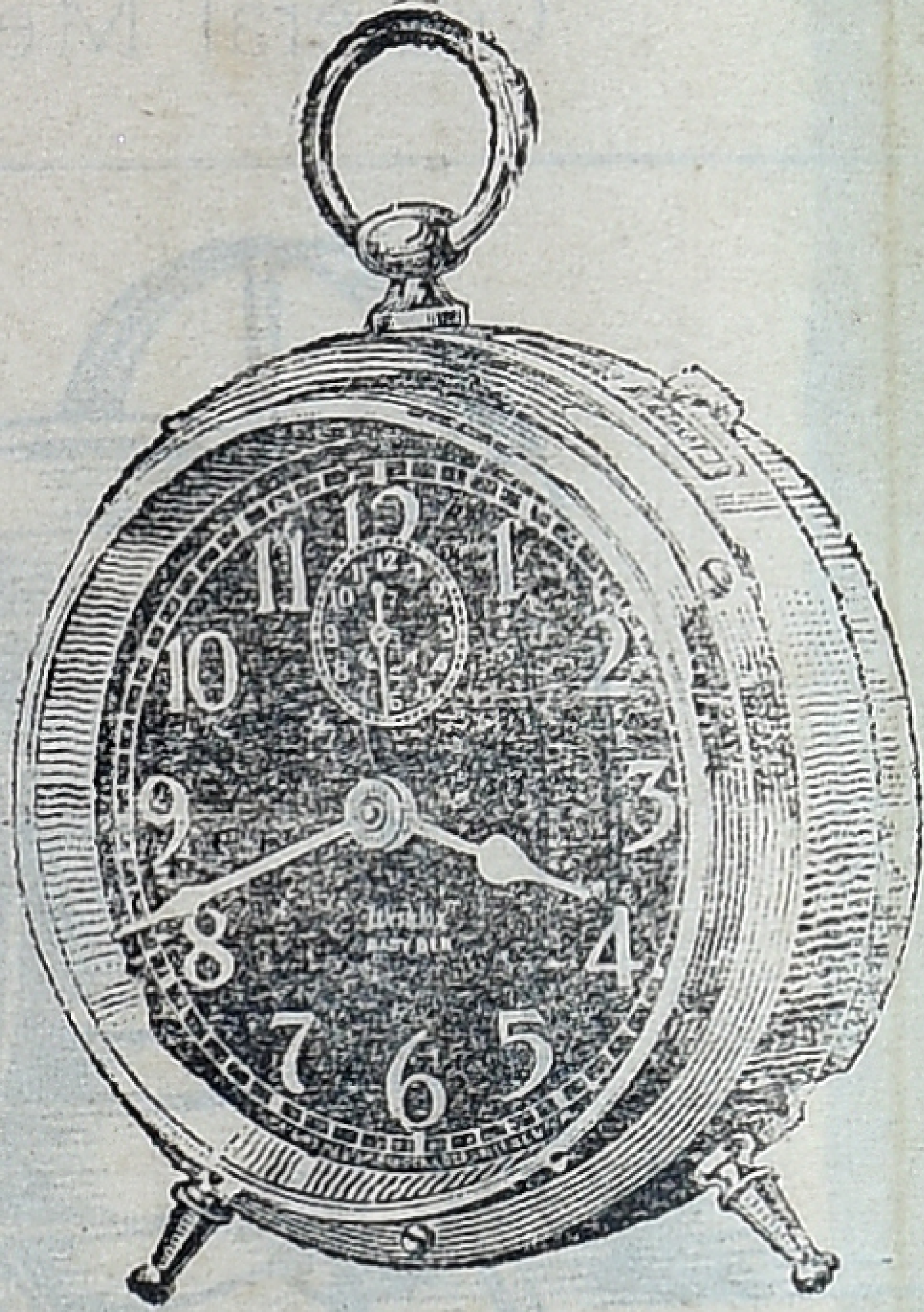

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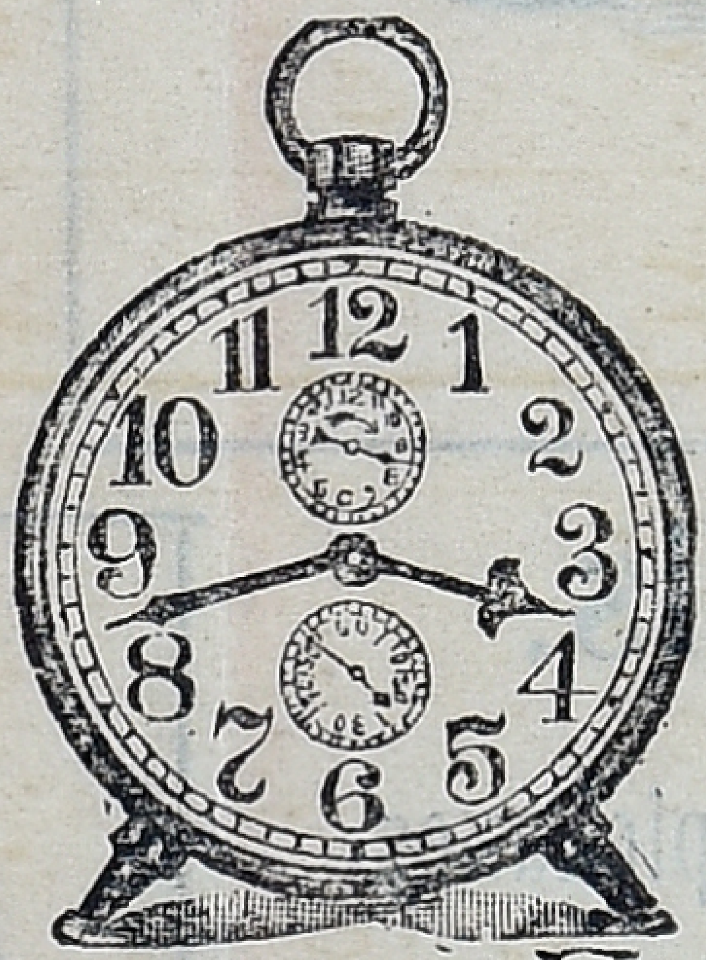

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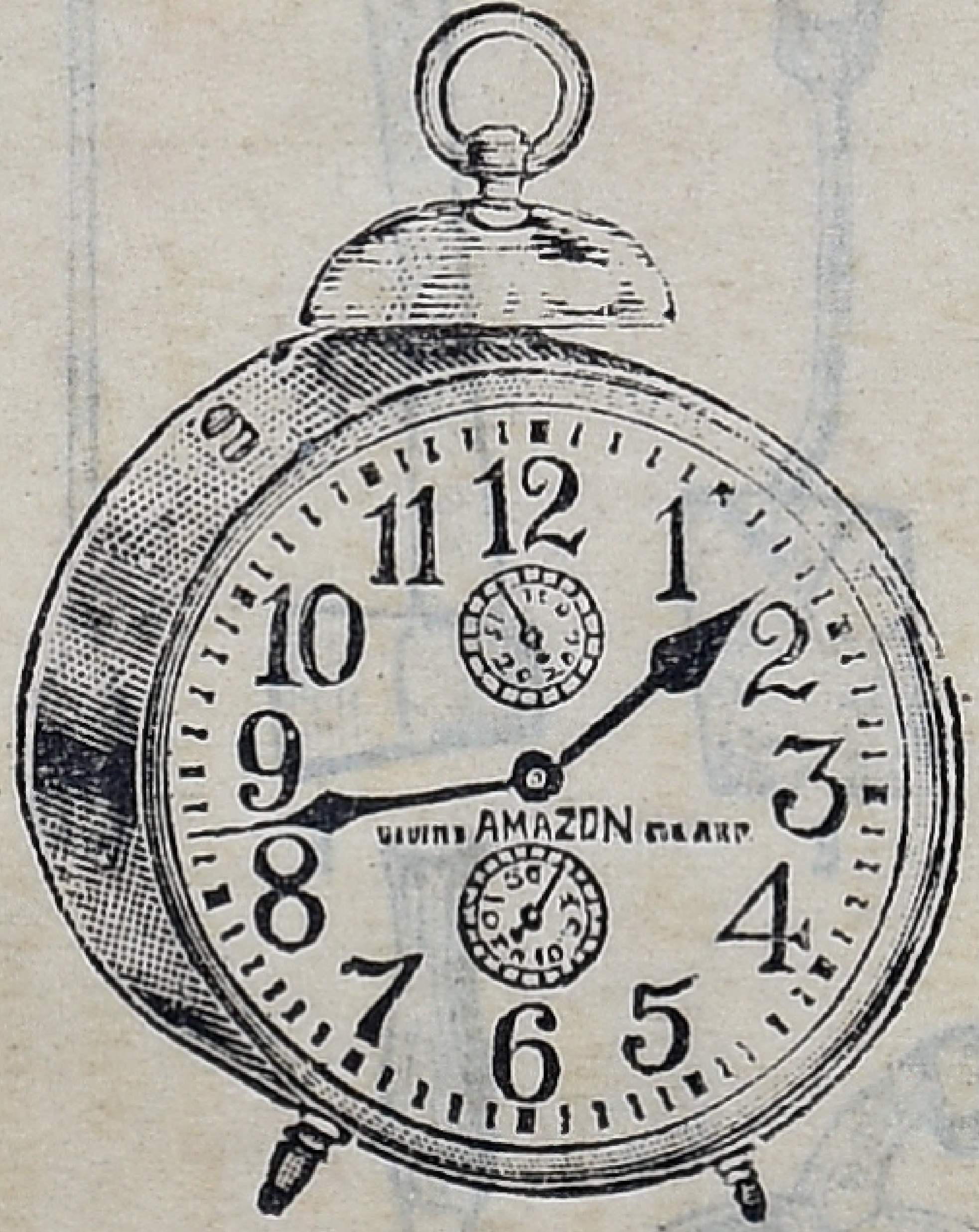

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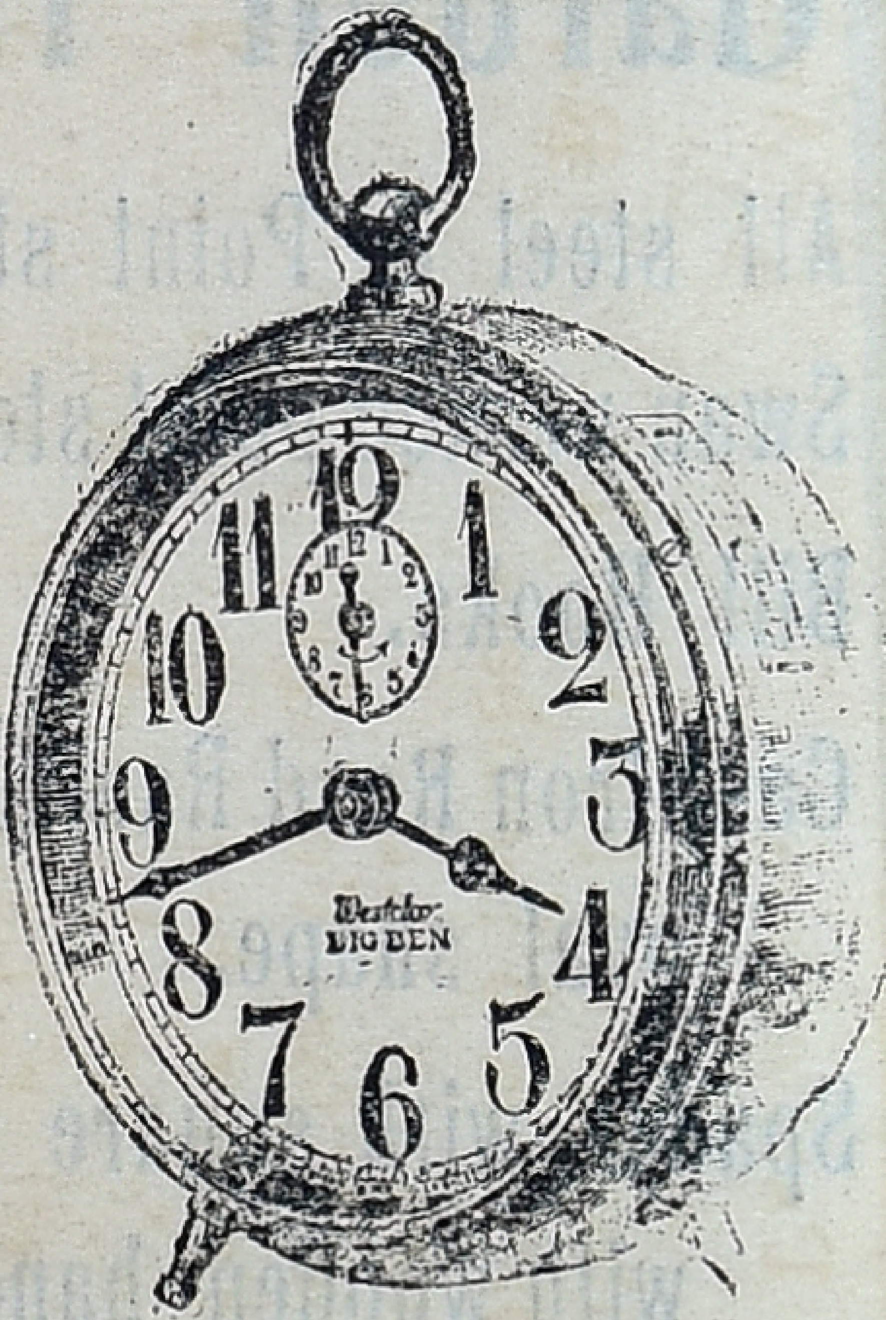

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